BRITISH COUNCIL

CBSE

Competency-based education for CBSE

Item Bank:

Maths Class 9

September 2021

Content created by AlphaPlus

Introduction for teachers

A bank of resources has been created to support teachers to develop and administer end-of-class tests. These resources should be used together. You can view and download the following resources from http://cbseacademic.nic.in

- Learning ladder for maths
- Assessment specification for maths
- Sample lesson plans

This document is a compilation of the sample items for Maths class 9. There are 112 items.

This item bank is supported by the assessment specification which sets out the end-of-class assessment requirements and the learning ladder for the subject which maps the CBSE syllabi content to the NCERT curriculum. The item index (page 7) shows how each item maps to the learning ladder content and the assessment objectives.

What these assessment items can be used for

You can use the bank of questions in whatever way you wish but three main purposes have been identified:

- Create end-of-class assessments using the items from the bank to meet the requirements set out in the assessment specifications.
- Create end-of-topic tests using the items from the bank for when you finish teaching a topic.
- Use individual or groups of questions from the bank to create or add to worksheets for use in class and for homework.

What is in this document

You will find linked questions and single questions which cover different aspects of the learning ladder content and different assessment objectives. You can use these questions to create your own assessments.

Each item in this document begins with the metadata (see Figure 1). The metadata gives details of the content, assessment objective coverage and the number of marks.

There is then a section showing any source material needed followed by the questions themselves and finally the mark scheme for the questions.

Item identity	AO1 marks	AO2 marks	C/N/E*	Content reference from the learning ladder	Marks
Maths6AS1	1		N	6A1a Form and use algebraic expressions (up to 2 variables, including use of brackets)	1

*C = Calculator required, N = Calculator not allowed, E = Either

Figure 1: Example of metadata

How to use the assessment items

You can peruse the bank of items by flicking through this document and selecting questions you wish to use. However, if you are assessing specific content then you can use the learning ladder to identify this content and then use the item index (page 7) to find any items which cover that content.

Please note that not all of the content will have items. The item bank is only a sample of the questions which could be created so it may be necessary for you to write questions of your own to fill gaps.

When you find a relevant assessment item in this document, you can copy and paste the question(s) and any source material into a new Word document which will form the assessment or worksheet. Other questions from the bank can be copied and pasted to this document and an assessment or worksheet covering a range of items created. The questions can then easily be edited in the new document using Word and you can add any questions you write to best meet the needs of your classes.

Once the questions have been pasted into the new document the numbering of the items can be changed so that they run through 1, 2 etc. There should be no need to change the numbering of parts (a), (b) etc. unless a question has been deleted.

You can create the mark schemes in the same way by copying the relevant section of the item documents and pasting them into a separate Word document which will form the mark scheme. Again, the question numbering will need to be amended. You can use these mark schemes to make sure that the marking is standardised, particularly if more than one teacher uses the assessment.

When creating an end-of-class test the teacher should use the assessment specification to identify the number of marks and questions needed, the balance of content to be covered and the weighting of the assessment objectives needed. You can then select items from the bank to build a test that meets the assessment specification and then order these in a logical manner so that it allows the students to work through the assessment. You should also add a front page with the assessment name and details of the number of marks and the length of the assessment. Again, the mark scheme can be created at the same time and question numbers will need to be amended.

When copying items from the bank care needs to be taken to keep the format and style of the items consistent including the spacing and layout and ensuring that the number of marks available for each question is clearly linked to the question.

Assessment objectives

This document sets out the assessment objectives for CBSE mathematics and their percentage weighting for the CBSE end of year tests for the different classes from VI to X.

		Class				
No.	**Description of Assessment Objective**	**VI**	**VII**	**VIII**	**IX**	**X**
AO1	Demonstrate knowledge and understanding of mathematical ideas, techniques and procedures.	50 - 65	50 - 65	50 - 65	40 - 55	40 - 55
AO2	Apply knowledge and understanding of mathematical ideas, techniques and procedures to classroom and real world situations	35 - 50	35 - 50	35 - 50	45 - 60	45 - 60

Demonstrate knowledge and understanding of mathematical ideas, techniques and procedures.

Students should be able to recall and apply mathematical knowledge, terminology and definitions to carry out routine procedures or straightforward tasks requiring single or multi-step solutions in mathematical or everyday situations. At appropriate class levels this would include:

- working accurately with information presented in words, tables, graphs and diagrams
- using and interpreting mathematical notation correctly
- using a calculator to perform calculations where appropriate
- understanding and using systems of measurement in everyday use
- estimating, approximating and working to appropriate levels of accuracy, and converting between equivalent numerical forms
- using geometrical instruments to measure and to draw to appropriate levels of accuracy
- recognising and using spatial relationships in two and three dimensions

Apply knowledge and understanding of mathematical ideas, techniques and procedures to classroom and real-world situations.

Students should be able to reason, interpret and communicate mathematically when solving problems. They should be able to analyse a problem, select a suitable strategy and apply appropriate techniques. At appropriate class levels this would include:

- presenting arguments and chains of reasoning in a logical and structured way
- assessing the validity of an argument
- interpreting and communicating information accurately, and changing from one form of presentation to another

- solving unstructured problems by putting them into a structured form
- recognising patterns in a variety of situations and forming generalisations
- applying combinations of mathematical skills and techniques using connections between different areas of mathematics
- making logical deductions, making inferences and drawing conclusions from given mathematical information, including statistical data
- interpreting results in the context of a given problem

Note: proportions for these AOs are presented as ranges. We suggest that the initial balance might use the high end of AO1 with the low end of AO2, moving over time towards increasing the proportion of AO2 over time as the new pedagogical approach is embedded.

Item Index

Assessment Content	Assessment Topic	File name	Question ID	AO1	AO2
9A1a	Algebra	Maths9GB4	Maths9GB4	1	
9A1a	Algebra	Maths9AN3	Maths9AN3	1	
9A1a	Algebra	Maths9SM6	Maths9SM6a	2	
9A1a	Algebra	Maths9SM6	Maths9SM6b	2	
9A1b	Algebra	Maths9DP10	Maths9DP10	4	1
9A1c	Algebra	Maths9RS6	Maths9RS6a	1	
9A1c	Algebra	Maths9RS6	Maths9RS6b		2
9A1c	Algebra	Maths9RS6	Maths9RS6c	1	
9A1c	Algebra	Maths9RS6	Maths9RS6d	1	
9A1c	Algebra	Maths9MS5	Maths9MS5a	2	
9A1c	Algebra	Maths9JJ4	Maths9JJ4		1
9A1c	Algebra	Maths9JJ8	Maths9JJ8b		3
9A1c	Algebra	Maths9AN7	Maths9AN7	2	3
9A1c	Algebra	Maths9AG3	Maths9AG3		4
9A2a	Algebra	Maths9NM2	Maths9NM2	1	
9A2a	Algebra	Maths9NM3	Maths9NM3	1	
9A2a	Algebra	Maths9IM8	Maths9IM8a	2	
9A2a	Algebra	Maths9IM8	Maths9IM8b	1	
9A2a	Algebra	Maths9DP2	Maths9DP2	1	
9A2a	Algebra	Maths9DP3	Maths9DP3	1	
9A2a	Algebra	Maths9GB5	Maths9GB5a	1	
9A2a	Algebra	Maths9GB5	Maths9GB5b	1	
9A2a	Algebra	Maths9GB5	Maths9GB5c	1	
9A2a	Algebra	Maths9AG4	Maths9AG4a		2
9A2a	Algebra	Maths9AG4	Maths9AG4b	1	
9A2a	Algebra	Maths9AG4	Maths9AG4c	1	
9A2a	Algebra	Maths9AG7	Maths9AG7a	2	
9A2a	Algebra	Maths9AG7	Maths9AG7b	2	
9A2a	Algebra	Maths9JJ7	Maths9JJ7a	2	
9A2a	Algebra	Maths9JJ7	Maths9JJ7b		3
9A2a	Algebra	Maths9AN6	Maths9AN6	4	
9A2a	Algebra	Maths9RS4	Maths9RS4	1	1
9A2a	Algebra	Maths9DP9	Maths9DP9	2	1
9A2b	Algebra	Maths9CN2	Maths9CN2	1	
9C1a	Coordinate geometry	Maths9NK2	Maths9NK2	1	
9C1a	Coordinate geometry	Maths9NK6	Maths9NK6a	1	
9C1a	Coordinate geometry	Maths9NM7	Maths9NM7a	1	
9C1a	Coordinate geometry	Maths9IM3	Maths9IM3	1	
9C1a	Coordinate geometry	Maths9GB2	Maths9GB2	1	
9C1a	Coordinate geometry	Maths9AG5	Maths9AG5a	1	
9C1a	Coordinate geometry	Maths9AG5	Maths9AG5b		2
9C1a	Coordinate geometry	Maths9JJ2	Maths9JJ2	1	

9C1a	Coordinate geometry	Maths9RS1	Maths9RS1	1	
9C1a	Coordinate geometry	Maths9SK4	Maths9SK4	1	
9C1a	Coordinate geometry	Maths9RM4	Maths9RM4	1	
9C1a	Coordinate geometry	Maths9DP5	Maths9DP5	2	
9C1a	Coordinate geometry	Maths9RS2	Maths9RS2	2	
9C1a	Coordinate geometry	Maths9JJ6	Maths9JJ6	3	
9C1a	Coordinate geometry	Maths9SM8	Maths9SM8a	1	1
9C1a	Coordinate geometry	Maths9SM8	Maths9SM8b	1	1
9C1a	Coordinate geometry	Maths9AN5	Maths9AN5	3	2
9G2a	Geometry	Maths9SM3	Maths9SM3	1	
9G2a	Geometry	Maths9CN1	Maths9CN1	1	
9G2a	Geometry	Maths9BS1	Maths9BS1	1	
9G2a	Geometry	Maths9LK1	Maths9LK1	1	
9G6e	Geometry	Maths9MS6	Maths9MS6a	1	
9G2a	Geometry	Maths9MS6	Maths9MS6b	2	
9G6b	Geometry	Maths9MS6	Maths9MS6c		3
9G2c	Geometry	Maths9NK8	Maths9NK8a	1	
9G2a	Geometry	Maths9NK8	Maths9NK8b	3	
9G2a	Geometry	Maths9NM8	Maths9NM8a	1	1
9G2a	Geometry	Maths9NM8	Maths9NM8b	2	1
9G2a	Geometry	Maths9BS7	Maths9BS7a	1	1
9G4b	Geometry	Maths9BS7	Maths9BS7b		5
9G2b	Geometry	Maths9IM1	Maths9IM1	1	
9G2b	Geometry	Maths9MS4	Maths9MS4	1	
9G2b	Geometry	Maths9LK5	Maths9LK5	2	
9G2b	Geometry	Maths9BS6	Maths9BS6a	3	
9G2b	Geometry	Maths9BS6	Maths9BS6b		4
9G2c	Geometry	Maths9MS3	Maths9MS3	1	
9G2c	Geometry	Maths9LK6	Maths9LK6a	2	
9G2c	Geometry	Maths9LK6	Maths9LK6b	1	
9G3d	Geometry	Maths9CN3	Maths9CN3	1	
9G3d	Geometry	Maths9CN5	Maths9CN5a		4
9G3f	Geometry	Maths9CN5	Maths9CN5b		2
9G3e	Geometry	Maths9LK3	Maths9LK3	1	
9G3e	Geometry	Maths9BS4	Maths9BS4		1
9G3e	Geometry	Maths9IM5	Maths9IM5	1	1
9G6f	Geometry	Maths9DP4	Maths9DP4	1	
9G4e	Geometry	Maths9NM7	Maths9NM7b	2	1
9G4f	Geometry	Maths9IM7	Maths9IM7		3
9G6b	Geometry	Maths9LK2	Maths9LK2	1	
9G6b	Geometry	Maths9NM1	Maths9NM1		1
9G6b	Geometry	Maths9BS8	Maths9BS8a	1	2
9G6b	Geometry	Maths9BS8	Maths9BS8b		4
9G6e	Geometry	Maths9LK7	Maths9LK7a		2
9G6e	Geometry	Maths9LK7	Maths9LK7b	1	
9G6b	Geometry	Maths9LK8	Maths9LK8		3

9G6h	Geometry	Maths9LK9	Maths9LK9a		2
9G6h	Geometry	Maths9LK9	Maths9LK9b	1	
9G6e	Geometry	Maths9LK10	Maths9LK10a	1	
9G6e	Geometry	Maths9LK10	Maths9LK10b	1	
9G6e	Geometry	Maths9LK10	Maths9LK10c	1	
9G6e	Geometry	Maths9LK10	Maths9LK10d	1	
9G6e	Geometry	Maths9CN7	Maths9CN7a	2	
9G6e	Geometry	Maths9CN7	Maths9CN7b		2
9G3e	Geometry	Maths9CN7	Maths9CN7c		2
9G4f	Geometry	Maths9CN8	Maths9CN8	2	3
9G6h	Geometry	Maths9CN9	Maths9CN9a	2	
9G6f	Geometry	Maths9CN9	Maths9CN9b		3
9G6h	Geometry	Maths9MS8	Maths9MS8a	2	
9G6h	Geometry	Maths9MS8	Maths9MS8b		5
9G6h	Geometry	Maths9AN1	Maths9AN1		1
9M1a	Mensuration	Maths9RS3	Maths9RS3	2	
9M2a	Mensuration	Maths9AN9	Maths9AN9a	1	1
9M1a	Mensuration	Maths9AN9	Maths9AN9b		2
9M1a	Mensuration	Maths9RS5	Maths9RS5		3
9M2a	Mensuration	Maths9IM6	Maths9IM6a	1	
9M2a	Mensuration	Maths9IM6	Maths9IM6b		2
9M2a	Mensuration	Maths9JJ3	Maths9JJ3	1	
9M2a	Mensuration	Maths9AN2	Maths9AN2		1
9M2a	Mensuration	Maths9SM5	Maths9SM5a	1	1
9M2a	Mensuration	Maths9SM5	Maths9SM5b	1	1
9M2a	Mensuration	Maths9DP8	Maths9DP8a	1	1
9M2a	Mensuration	Maths9DP8	Maths9DP8b	3	1
9M2a	Mensuration	Maths9RS8	Maths9RS8a		2
9M2a	Mensuration	Maths9RS8	Maths9RS8b		2
9M2a	Mensuration	Maths9RS8	Maths9RS8c		2
9M2a	Mensuration	Maths9AG1	Maths9AG1	1	2
9M2a	Mensuration	Maths9AG2	Maths9AG2	2	2
9M2a	Mensuration	Maths9GB7	Maths9GB7	2	2
9M2a	Mensuration	Maths9GB8	Maths9GB8	2	2
9M2a	Mensuration	Maths9JJ9	Maths9JJ9	2	2
9M2a	Mensuration	Maths9NK6	Maths9NK6b		3
9M2a	Mensuration	Maths9GB3	Maths9GB3		3
9N1a	Number systems	Maths9SM2	Maths9SM2	1	
9N1a	Number systems	Maths9JJ8	Maths9JJ8a	3	
9N1c	Number systems	Maths9NK1	Maths9NK1	1	
9N1e	Number systems	Maths9MS2	Maths9MS2	1	
9N1e	Number systems	Maths9NK5	Maths9NK5a	2	
9N1f	Number systems	Maths9NK5	Maths9NK5b	2	
9N1e	Number systems	Maths9NM5	Maths9NM5a	2	
9N1f	Number systems	Maths9NM5	Maths9NM5b	2	
9N1e	Number systems	Maths9CN6	Maths9CN6a		1

9N1f	Number systems	Maths9CN6	Maths9CN6b		1
9N1b	Number systems	Maths9CN6	Maths9CN6c		2
9N1e	Number systems	Maths9LK11	Maths9LK11		4
9N1e	Number systems	Maths9LK12	Maths9LK12a		2
9N1e	Number systems	Maths9LK12	Maths9LK12b		2
9N1e	Number systems	Maths9MS5	Maths9MS5b		6
9N1f	Number systems	Maths9IM4	Maths9IM4	1	
9N1f	Number systems	Maths9SM1	Maths9SM1	1	
9N1f	Number systems	Maths9BS2	Maths9BS2	1	
9N1f	Number systems	Maths9LK4	Maths9LK4	1	
9N1f	Number systems	Maths9BS5	Maths9BS5	1	1
9S1a	Statistics and probability	Maths9RS7	Maths9RS7a	1	
9S1a	Statistics and probability	Maths9RS7	Maths9RS7b	1	
9S1a	Statistics and probability	Maths9RS7	Maths9RS7c	1	
9S1b	Statistics and probability	Maths9NM6	Maths9NM6a	1	
9S1b	Statistics and probability	Maths9NM6	Maths9NM6b	3	
9S1b	Statistics and probability	Maths9IM9	Maths9IM9a	1	1
9S1b	Statistics and probability	Maths9IM9	Maths9IM9b	1	
9S1b	Statistics and probability	Maths9AN8	Maths9AN8a	3	
		Maths9AN8	Maths9AN8b	3	
9S1b	Statistics and probability	Maths9NK3	Maths9NK3		1
9S1b	Statistics and probability	Maths9JJ1	Maths9JJ1		1
9S1b	Statistics and probability	Maths9DP7	Maths9DP7	2	1
9S2a	Statistics and probability	Maths9NK7	Maths9NK7a	1	
9S1b	Statistics and probability	Maths9NK7	Maths9NK7b		3
9S1b	Statistics and probability	Maths9JJ5	Maths9JJ5a	2	
9S1b	Statistics and probability	Maths9JJ5	Maths9JJ5b		4
9S1c	Statistics and probability	Maths9GB6	Maths9GB6	1	1
9S2a	Statistics and probability	Maths9NM4	Maths9NM4	1	
9S2a	Statistics and probability	Maths9IM2	Maths9IM2	1	
9S2a	Statistics and probability	Maths9AN4	Maths9AN4	1	

Maths9GB4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9GB4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9GB4	1		E	9A1a Identify factors and multiples of constant, linear, quadratic and cubic polynomials	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to factorise a given quadratic polynomial and identify its factors

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 Which of the following is a factor of $p(x) = 3x^2 - 2 - 5x$?

A. $x - 1$
B. $x + 1$
C. $x - 3$
D. $3x + 1$

(1 mark)

(Total marks 1)

Mark scheme

1 Which of the following is a factor of $p(x) = 3x^2 - 2 - 5x$?

A. $x - 1$
B. $x + 1$
C. $x - 3$
D. $3x + 1$

Answer	Guidance
D. 3x + 1	A1 – Correct answer only Explanation: $3x^2 - 5x - 2 = (x - 2)(3x + 1)$ ⇒ (x – 2) and (3x + 1) are factors of p(x)

Maths9AN3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN3

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN3	1		N	9A1a Identify factors and multiples of constant, linear, quadratic and cubic polynomials	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to factorize a quadratic polynomial.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 The area of a rectangle is $6x^2 + 5x - 6$. The possible dimensions of its length and breadth are:

A. (2x-3), (3x-2)
B. (2x+3), (3x-2)
C. (2x-3), (3x+2)
D. (2x+3), (3x+2)

(1 mark)

(Total marks 1)

Mark scheme

1 The area of a rectangle is $6x^2 + 5x – 6$. The possible dimensions of its length and breadth are: A. (2x-3), (3x-2) B. (2x+3), (3x-2) C. (2x-3), (3x+2) D. (2x+3), (3x+2)	
Answer	Guidance
B. (2x+3) (3x-2)	A1: Correct answer only Other acceptable answers: B, (2x+3), (3x-2) or (3x-2) (2x+3)

Maths9SM6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9SM6

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9SM6a	2		N	9A1a Identify factors and multiples of constant, linear, quadratic and cubic polynomials	2
Maths9SM6b	2		N	9A1a Identify factors and multiples of constant, linear, quadratic and cubic polynomials	2
Total marks	**4**				**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the concept of factorisation of a quadratic equation.

Question(s)

1 Two students in class of IX named Ria and Ravya were assigned a polynomial by their maths teacher. The polynomial was $p(x) = x^2 - 5x + 6$.

They were asked to express this polynomial as product of factors. Both applied factorisation by splitting the middle term and got different answer.

Riya's answer:(x-3) (x-2)

Ravya's answer: (x+3) (x-2).

1 (a) Find out whose answer is correct and show factorisation.

(2 marks)

1 (b) Find the value of p (-1).

(2 marks)

(Total marks 4)

Mark scheme

1 (a) Find out whose answer is correct and show factorisation.	
Answer	Guidance
p(x) = x^2 - 5x + 6 (1) = x^2-3x-2x+6 =(x-3) (x-2) (1)	M1 for valid method (factorise again, or multiply the two expressions out) A1 for correct answer (Riya) - dependent on seeing some working.
1 (b) Find the value of p (-1)	
Answer	Guidance
p(x) = x^2 - 5x + 6 p (-1) = $(-1)^2$ – 5(-1) + 6 (1) = 1 + 5 + 6 =12 (1)	M1 for substitution A1 for correct answer

Maths9DP10

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9DP10

*C = Calculator required, N = Calculator not allowed, E = Either

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP10	4	1	C	9A1b Use the Remainder and Factor Theorems, including to factorise a cubic polynomial, and to identify zeroes of a polynomial.	5

Item purpose

This question assesses the ability of the student to find the value of a given polynomial at given values of variable.

Sources and diagrams

Question

1 If $p(x) = x^3+3x^2-2x+4$, then find the value of $p(2)+p(-2)-p(0)$.

Show your working.

(5 marks)

(Total marks 5)

Mark scheme

1 If $p(x) = x^3+3x^2-2x+4$, then find the value of p (2) +p (-2)-p (0). Show your working.	
Answer	Guidance
28	M1 for finding p(2)

$p(2) = 8+12-4+4=20$ (1) $p(-2) = -8+12+4+4=12$ (1) $p(0) = 4$ (1) $p(2)+p(-2)-p(0)= 20+12-8 = 28$ (2)	M1 for finding p(-2) M1 for finding p(0) M1 for correct calculation A1 for writing correct answer

Maths9RS6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS6

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS6a	1		c	9A1c Recall of algebraic expressions and identities.	1
Maths9RS6b		2	N	9A1c Recall of algebraic expressions and identities.	2
Maths9RS6c	1		N	9A1c Recall of algebraic expressions and identities.	1
Maths9RS6d	1		N	9A1c Recall of algebraic expressions and identities.	1
Total marks	**3**	**2**			**5**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the concept of factorisation, finding value of a polynomial in real life situation.

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question(s)

1 Two brothers Ashish and Amit wanted to start a business together. They decided to share their amount depending upon the variable expenditure. The amount of two partners is given by the expression $12x^2 + 11x - 15$., which is the product of their individual share factors.

On the basis of the above information answer the following questions

1 (a) Find total expenditure of Ashish and Amit when x = Rs 100.

(1 mark)

1 (b) Find individual share factor of Ashish and Amit in terms of x.

(2 marks)

1 (c) Find the value of x if their shares are equal.

(1 mark)

1 (d) Find the sum of their expenditure in terms of x.

(1 mark)

(Total marks 5)

Mark scheme

1 (a) Find total expenditure of Ashish and Amit when x = Rs 100 .	
Answer	Guidance
Total expenditure $=12x^2 + 11x - 15$ Put x= 100 $= 12 \times 100 \times 100 + 1100 - 15$ = 120000+1100- 15 = Rs 121,085	A1 For correct answer
1 (b) Find individual share factor of Ashish and Amit in terms of x	

Answer	Guidance
$12x^2 + 11x - 15$ $= 12x^2 + 20x - 9\,x - 15$ …….(i) = 4x(3x +5) – 3(3x +5) = (3x+ 5) (4x -3) Share of Ashish and Amit are either (3x+5) and (4x-3) or (4x-3) and (3x+5) respectively.	M1 For splitting the middle term correctly A1 For correct factors
1 (c) Find the value of x if their shares are equal.	
Answer	Guidance
According to the question, if their shares are equal 4x – 3 = 3x + 5 4x -3x = 5 + 3 X = 8	A1 for correct answer
1 (d) Find the sum of their shares in terms of x.	
Answer	Guidance
Sum of their shares = 4x – 3+ 3x +5 = 7x + 2	A1 For correct addition

Maths9MS5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9MS5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9MS5a	2		N	9A1c Recall of algebraic expressions and identities. Verification of identities:	2
Maths9MS5b		6	N	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type $\frac{1}{ax+by\sqrt{2}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$ (where x and y are natural numbers and a and b are integers.	6
Total marks	**2**	**6**			**8**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of evaluating irrational numbers using Rationalisation

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 If $x = 3 - 2\sqrt{2}$ and $y = 3 + 2\sqrt{2}$

1 (a) Evaluate : $x^2 + y^2$

(2 marks)

1 (b) Evaluate : $\left(x^2 - \frac{1}{x^2}\right)\left(x^2 + \frac{1}{x^2}\right)$

(5 marks)

(Total marks 7)

Mark scheme

1 (a) Evaluate : $x^2 + y^2$	
Answer	Guidance
34	M1 Evaluating the value of xy M1 Evaluating the value of $x^2 + y^2 = (x + y)^2 - 2xy$ A1 Evaluating xy – (1 Mark) A2 Evaluating $x^2 + y^2 = (x + y)^2 - 2xy$ = 34 – (1 Mark)
1 (b) Evaluate : $\left(x^2 - \frac{1}{x^2}\right)\left(x^2 + \frac{1}{x^2}\right)$	
Answer	Guidance
(-24 $\sqrt{2}$)*32	M1 Evaluating $x - \frac{1}{x}$ M1 Evaluating $x^2 - \frac{1}{x^2}$ M1 Evaluating $x^2 + \frac{1}{x^2}$ M1 Find the answer A1 Evaluating $x - \frac{1}{x}$ = - $4\sqrt{2}$ – (2 Marks) A2 Evaluating $x^2 - \frac{1}{x^2} = \left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$- (2 marks) A3 Evaluating $x^2 + \frac{1}{x^2}$ – (1 Mark) A4 Evaluating $\left(x^2 - \frac{1}{x^2}\right)\left(x^2 + \frac{1}{x^2}\right)$ – 1 mark)

Maths9JJ4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ4		1	C	9A1c Recall of algebraic expressions and identities	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of student to use basic identities in polynomials.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 If $x + y = 7, x^2 + y^2 = 26.5$, then find the value of $\sqrt{xy}$?

A. 3.35
B. 4.74
C. 11.25
D. 22.50

(1 mark)

(Total marks 1)

Mark scheme

1 If $x + y = 7, x^2 + y^2 = 25$, then find the value of √(xy)?

A. 3.35
B. 4.74

C. 11.25 D. 22.50	
Answer	Guidance
A. 3.35	1 Mark for the correct answer

Maths9JJ8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ8

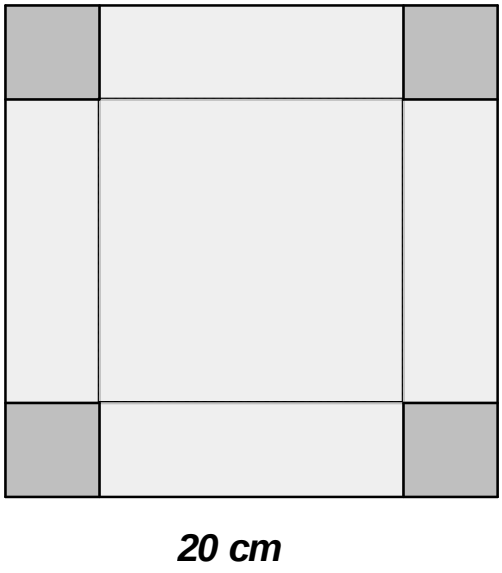
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ8a	3		N	8G1b Draw and interpret 2D representations of 3D shapes	3
Maths9JJ8b		3	N	9A1c Recall of algebraic expressions and identities 9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones	3
Total marks	**3**	**3**			**6**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the students to construct and interpret bar graphs.

Sources and diagrams



Question(s)

1 Joan has a 20 cm x 20 cm square card board with him. He wanted to make a box by cutting the squares of integral length from the corner and by folding the flaps along the sides

1 (a) What are the possible different sizes of the boxes Joan can make. List all such boxes?

(3 marks)

1 (b) What is the volume of the box if Joan cuts a square of side x cm from each corner?

(3 marks)

(Total marks 6)

Mark scheme

1(a) What are the possible different sizes of the boxes Joan can make. List all such boxes?	
Answer	Guidance
18x18x1 16x16x2 14x14x3 12x12x4	M1-for writing at least sizes of 3 different boxes. M1-for writing at least sizes of 6 different boxes. A1-for writing all the 9 possible sizes.

10x10x5 8x8x6 6x6x7 4x4x8 2x2x9	
1(b) What is the volume of the box if Joan cuts a square of side x cm from each corner?	
Answer	Guidance
Volume = $(20-2x)^2\ (x)$ = $(4x^3$ - $80x^2+400x\ )\ cm^3$ =4 $(x^3$ - $20x^2+100x\ )\ cm^3$ Any of these is acceptable.	.M1- Volume of the cuboids = length x breadth x height M1- finding length = 20-2x, breadth 20-2x and height =x and volume = $(20-2x)^2\ (x)$or equivalent form A1- for correct Volume. Don't penalize if cm^3 is not written. Don't penalize if final answer is not simplified by taking 4 common

Maths9AN7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN7

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN7	2	3	N	9A1c Recall of algebraic expressions and identities. Verification of identities: and their use in factorization of polynomials	5

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to apply algebraic identities to solve polynomials.

Question

1 If $x^2 + \frac{1}{x^2}$ = 34, and x > 0, find the value of $x^3 + \frac{1}{x^3}$ - 9. Show all the steps.

(5 marks)

(Total marks 5)

Mark scheme

1 If $x^2 + \frac{1}{x^2}$ = 34, find the value of $x^3 + \frac{1}{x^3}$ - 9. Show all the steps.	
Answer	Guidance
189 $x^2 + \frac{1}{x^2}$ = 34	

$(x+\frac{1}{x})^2 = x^2+\frac{1}{x^2}+2$ = 34 + 2 = 36 So, $x+\frac{1}{x}$ = 6 (or –6, discounted as x > 0) Cubing both sides $(x+\frac{1}{x})^3$ = 6^3 $x^3+\frac{1}{x^3}+3\,(x+\frac{1}{x})=216$ $x^3+\frac{1}{x^3}+3\times 6=216$ $x^3+\frac{1}{x^3}$ = 198 $x^3+\frac{1}{x^3}$ - 9 = 198 - 9 = 189	M1: Stating the correct identity $(a+b)^2$ M1: Finding correct value of $x+\frac{1}{x}$ M1: Stating the correct identity $(a+b)^3$ M1: Finding correct value of $x^3+\frac{1}{x^3}$ A1: Correct answer of expression.

Maths9AG3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AG3

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AG3		4	C	9A1c Recall of algebraic expressions and identities. Verification of identities and their use in factorization of polynomials.	4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the logical thinking in daily life and how the concept of factorisation is applicable.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 Ashima donated a certain amount of money to a blind school.

Her friend Manya wanted to know the amount donated by her, but Ashima did not disclose the amount she donated, instead she gave her a hint that if

$(x + \frac{1}{x})$ = Rs. 7 then the amount donated by her is Rs. $(x^3 + \frac{1}{x^3})$.

Find the amount donated by Ashima to the school.

(4 marks)

(Total marks 4)

Mark scheme

1 Ashima donated a certain amount of money to a blind school. Her friend Manya wanted to know the amount donated by her, but Ashima did not disclose the amount she donated, instead she gave her a hint that if $(x + \frac{1}{x})$ = Rs. 7 then the amount donated by her is Rs. $(x^3 + \frac{1}{x^3})$. Find the amount donated by Ashima to the school	
Answer	Guidance
Rs. 322	M 1 $(x + \frac{1}{x})^3 = 7^3$ M 1 $x^3 + \frac{1}{x^3} + 3x\frac{1}{x}\left(x + \frac{1}{x}\right) = 343$ M 1 Put value of $x + \frac{1}{x}$ in above A 1 $x^3 + \frac{1}{x^3} = 322$

Maths9NM2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM2	1		N	9A2a Identify the solutions of a linear equation in two variables (x,y) as a straight line including where x or y is a constant i.e. the equation has only one variable.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the fact that every point on the graph of a linear equation in two variables is a solution of the linear equation.

Sources and diagrams

	x	-1	0	1	2
	y	-3	-1	1	3

Question

1 Which equation fits the data given in the above table?

A. $y = x - 2$

B. $y = 2x - 1$

C. $y = 3x - 3$

D. $y = x + 1$

(1 mark)

(Total marks 1)

Mark scheme

1 Which equation fits the data given in the above table? A. $y = x - 2$ B. $y = 2x - 1$ C. $y = 3x - 3$ D. $y = x + 1$	
Answer	Guidance
B. $y = 2x - 1$ (1) All the values given in the table satisfy the equation $y = 2x - 1$	A1 – 1 mark for correct answer

Maths9NM3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM3

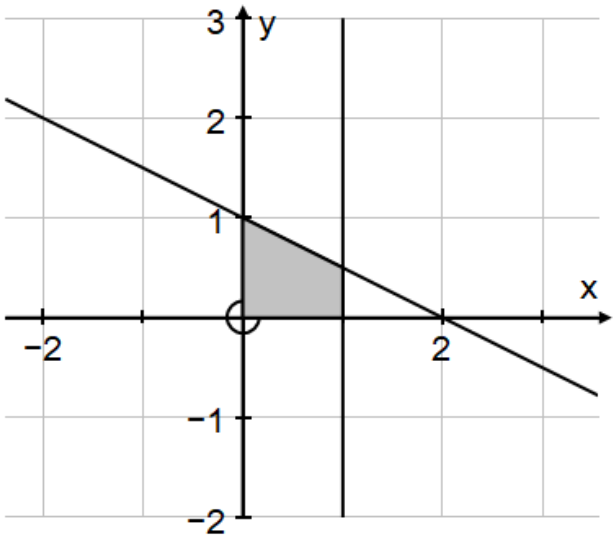
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM3	1		N	9A2a Identify the solutions of a linear equation in two variables (x,y) as a straight line including where x or y is a constant i.e. the equation has only one variable.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the property of equations of lines parallel to the x-axis and y=-axis and the line passing through the origin.

Sources and diagrams



Question

1 In the rectangular coordinate system given above, the shaded region is bounded by straight lines. Which of the following is not an equation of one of the boundary lines?

A. $x - y = 0$

B. $x = 1$

C. $x + 2y = 2$

D. $x = 0$

(1 mark)

(Total mark 1)

Mark scheme

1 In the rectangular coordinate system given above, the shaded region is bounded by straight lines. Which of the following is not an equation of one of the boundary lines? A. $x - y = 0$ B. $x = 1$ C. $x + 2y = 2$ D. $x = 0$	
Answer	Guidance
A. $x - y = 0$ (1) Observation: The line x – y = 0 is the same as y = x which passes through the origin and runs diagonally. All other lines represent a boundary of the shaded region.	A1 – 1 mark for correct answer

Maths9IM8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM8

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM8a	2		C	9A2a - Identify the solutions of a linear equation in two variables (x, y) as a straight line.	3
Maths9IM8b	1		C	9A2a - Identify the solutions of a linear equation in two variables (x, y) as a straight line.	
Total marks	**3**				**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to find solutions and plot a linear graph in two variables.

Question(s)

1 (a) Which points given below satisfy the equation 2x + 3y = 12?

i. (-6, 8)

ii. (6, -8)

iii. (3, 2)

(2 marks)

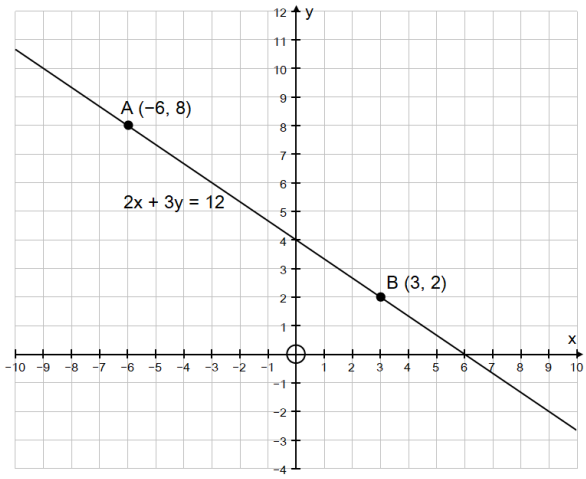
1 (b) Plot the graph of the equation 2x + 3y = 12 on the graph sheet provided

(1 mark)

(Total 3 marks)

Mark scheme

1 (a) Which points given below satisfy the equation 2x + 3y = 12?
i. (-6, 8)

ii. (6, -8) iii. (3, 2)	
Answer	Guidance
i. & iii. (-6, 8) & (3, 2) (2)	M 1 for (-6, 8) M2 for (3, 2) Correct response only
1 (b) Plot the graph of the equation 2x + 3y = 12 on the graph sheet provided	
Answer	Guidance
	M 1 Plotting the graph correctly Accept different points also, if correct, but labelling not required. Equation not needed (not asked for)

Maths9DP2

This assessment item is designed to assess the end of class assessments for CBSE schools

Subject	Class	Question reference/Filename
Maths	9	Maths9DP2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP2	1		N	9A2a Identify the solutions of a linear equation in two variables (*x, y*) as a straight line, including where *x* or *y* is a constant i.e. the equation has only one variable.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

This question assesses the ability of the student to identify a linear equation in one variable.

Sources and diagrams

Question

1 Which of the following is a linear equation in one variable?

A. $2x + 3y = 0$
B. $x^2 = 5x + 3$
C. $5x = y^2 + 3$
D. $2x + 5 = 11$

(1 mark)

(Total marks 1)

Mark scheme

1 Which of the following is a linear equation in one variable?	
Answer	Guidance
D. $2x + 5 = 11$	A1 for correct answer

Maths9DP3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9DP3

required, N = *C =

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP3	1		E	9A2a Identify the solutions of a linear equation in two variables (*x, y*) as a straight line, including where *x* or *y* is a constant i.e. the equation has only one variable.	1

Item purpose

This question assesses the ability of the student to form a linear equation.

Sources and diagrams

Question

1 The cost of book (x) exceeds twice the cost of pen (y) by 10 rupees. This statement can be expressed as linear equation as:

A. $x -2y-10=0$
B. $2x-y-10=0$
C. $2x+y-10=0$
D. $x-2y+10=0$

(1 mark)

(Total marks 1)

Mark scheme

1 The cost of book (x) exceeds twice the cost of pen (y) by 10 rupees. This statement can be expressed as linear equation as: A. $x -2y-10=0$ B. $2x-y-10=0$ C. $2x+y-10=0$ D. $x-2y+10=0$	
Answer	Guidance
A. $x-2y-10=0$	M1 for correct answer

Maths9GB5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9GB5

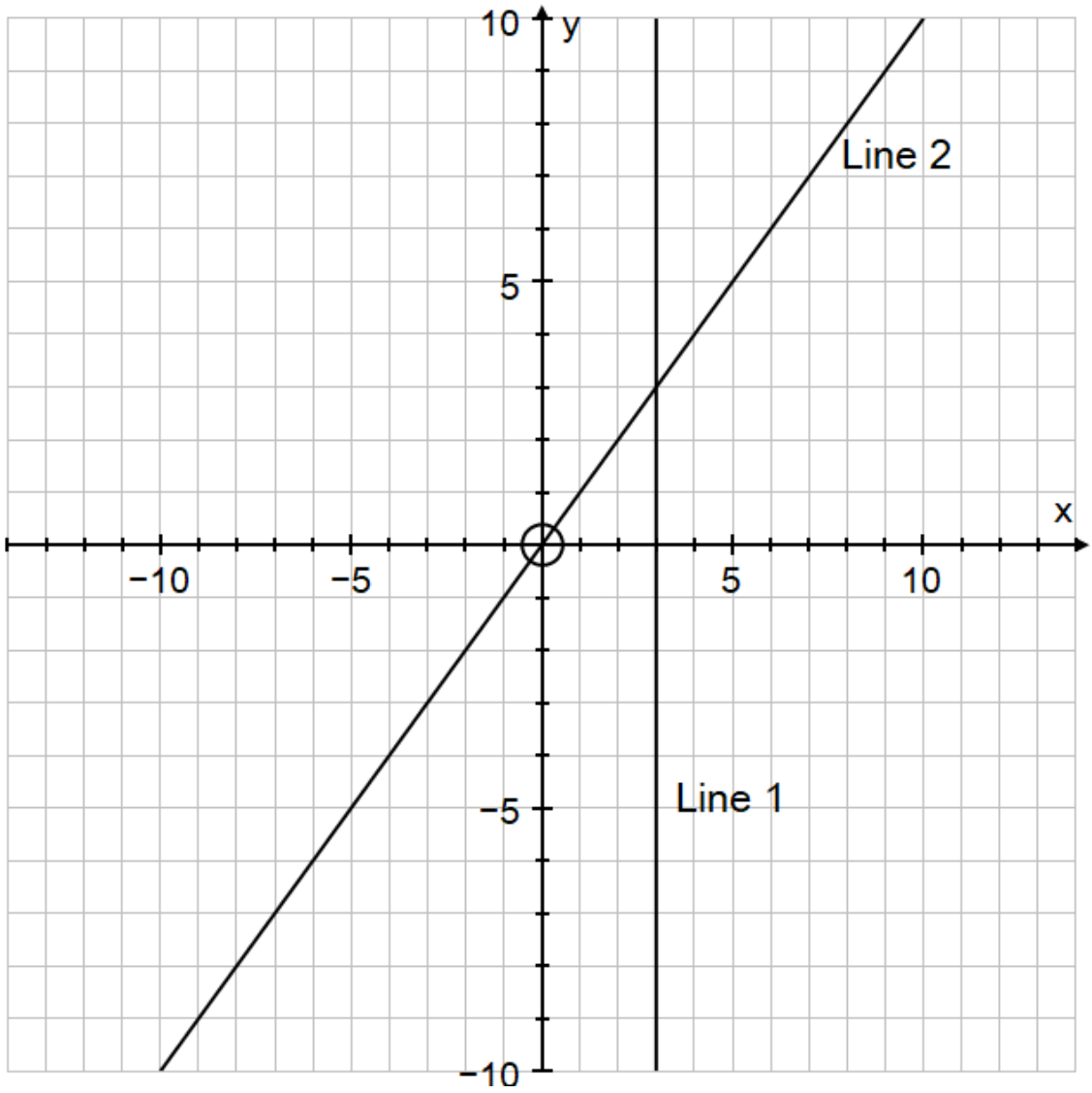
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9GB5a	1		E	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable.	1
Maths9GB5b	1		E	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable.	1
Maths9GB5c	1		E	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable.	1
Total marks	**3**				**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to identify solutions of a linear equation in one and two variables, and formulate equation on the basis of the acquired information

Sources and diagrams



Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 In the given graph two lines, line 1 and line 2 are drawn.

1 (a) What is the equation of line 1?

(1 mark)

1 (b) What is the equation of line 2?

(1 mark)

1 (c) Write the common solution of the two lines.

(1 mark)

(Total marks 3)

Mark scheme

1 (a) What is the equation of line 1?	
Answer	Guidance
x – 3 = 0 Accept x = 3 (1)	A1 – only for correct answer
1 (b) What is the equation of line 2?	
Answer	Guidance
x – y = 0 (1) Accept x = y or y = x or y – x = 0	A1 – Only for correct answer
1 (c) Write the common solution of the two lines.	
Answer	Guidance
(3, 3) (1)	A1 – Only for correct answer

Maths9AG4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AG4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AG4a		2	E	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable.	2
Maths9AG4b	1		N	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable.	1
Maths9AG4c	1		N	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable.	1
Total marks	**2**	**2**			**2**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the concept of linear equation in different conditions.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1(a) Draw the graph of $3\,x - 2 = 0\ and\ 2y - 1 = 0$

(2 marks)

1(b) Say whether the lines in the graph intersect each other or not.

(1mark)

1(c) What relationship do you observe between the lines?

(1 marks)

(Total marks 4)

Mark scheme

1 (a) Draw the graph of $3\,x - 2 = 0\ and\ 2y - 1 = 0$	
Answer	Guidance
	M 1 $x = \frac{2}{3} = 0.7$ and $y = \frac{1}{2} = 0.5$ A 1 Correct graph along with scale.
1 (b) Say whether the lines in the graph intersect each other or not.	
Answer	Guidance
Yes	A 1 Yes
1 (c) What relationship do you observe between the lines?	
Answer	Guidance
Perpendicular	A 1 Perpendicular to each or forms right angle with each other.

Maths9AG7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AG7

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AG7a	2		E	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable	2
Maths9AG7b	2		E	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e. the equation has only one variable	2
Total marks	**4**				**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses that how linear equations will be used in daily life situations and how the concept is applicable to the given situations.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 Mrs. Sharma lost her purse containing Rs 50 and Rs 100 notes amounting to Rs 1500 in a market.

1(a) Represent the above situation as a linear equation in two variables.

(2 marks)

1(b)

Draw the graph of above equation.

(2 marks)

(Total marks 4)

Mark scheme

1 (a) Represent the above situation as a linear equation in two variables.	
Answer	Guidance
x + 2y = 30	M 1 Let no. of Rs 50 note be x and no. of Rs. 100 notes be y. (accept any variable labels) A 1 50x + 100y = 1500 OR x + 2y = 30
1 (b) Draw the graph of above equation and mention the type of graph obtained.	
Answer	Guidance
 Linear Graph	M 1 At least correct 2 values of x and y. A 1 Correct graph.

Maths9JJ7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ7

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ7a	2		N	9A2a Identify the solutions of a linear equation in two variables (*x, y*) as a straight line, including where *x* or *y* is a constant i.e. the equation has only one variable.	2
Maths9JJ7b		3	N	9A2a Identify the solutions of a linear equation in two variables (*x, y*) as a straight line, including where *x* or *y* is a constant i.e. the equation has only one variable.	3
Total marks	**2**	**3**			**5**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the students to construct and interpret bar graphs.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 Consider the linear equation $11x - 2y = 35$

1 (a) If (p, p+5) is a solution of the linear equation $11x - 2y = 35$, find the value of p?

(2 marks)

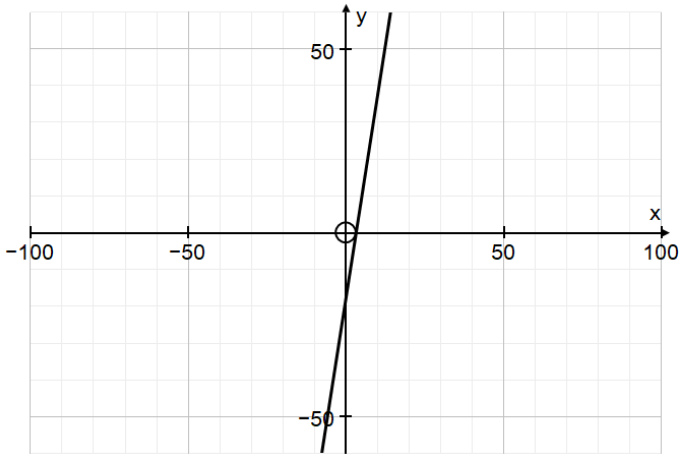
1 (b) Draw the graph of the linear equation $11x - 2y = 35$.

(3 marks)

(Total marks 5)

Mark scheme

<table>
<tr><td colspan="2">1(a) If (p, p+5) is a solution of the linear equation$11x - 2y = 35$, find the value of p?</td></tr>
<tr><td>Answer</td><td>Guidance</td></tr>
<tr><td>p = 5

$11x-2y=35$
$11p-2(p+5)=35$
$11p-2p-10=35$
$9p=45$
$p=5$</td><td>M1-for using the concept that (p, p+5) is a solution, so it satisfies the equation.
A1- for simplifying and finding the correct answer as 5
Also, if a student find the correct answer using trial and error method give full marks.</td></tr>
<tr><td colspan="2">1(b) Draw the graph of the linear equation$11x - 2y = 39$.</td></tr>
<tr><td>Answer</td><td>Guidance</td></tr>
<tr><td> 
</td><td>M1-for graphing x axis and y axis and labelling.
M1- for finding any two solutions of the given linear equation.
A1 - for drawing the correct graph by drawing a line passing through the two solution points.</td></tr>
</table>

Maths9AN6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN6

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN6	4		N	9A2a Identify the solutions of a linear equation in two variables (x, y) as a straight line, including where x or y is a constant i.e., the equation has only one variable.	4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to plot a linear graph and identify intercepts on axes.

Sources and diagrams

x	1	2
y	1	3

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 The following values of x and y are thought to satisfy a linear equation.

Draw the graph using the values of x and y as given in the table above.

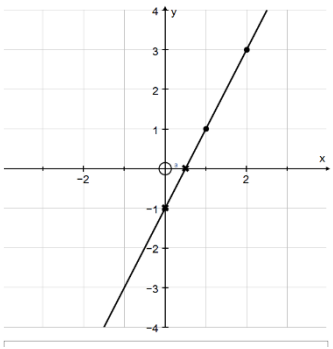
Find the points at which the graph cuts:

A. x-axis
B. y-axis

(4 marks)

(Total marks 4)

Mark scheme

1 The following values of x and y are thought to satisfy a linear equation. Draw the graph using the values of x and y as given in the table above. Find the points at which graph cuts A. x-axis B. y-axis	
Answer	Guidance
A. x-axis at (0.5, 0) B. y-axis at (0, -1)  	M1: Correctly plotting (1,1) M1: Correctly plotting (2,3) A1: Correct mention of point on x-axis at (0.5, 0) A1: Correct mention of point on y-axis at (0, -1) Marks should not be deducted if students show points (0.5,0) and (0, -1) on the graph itself instead of stating them.

Maths9RS4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS4	1	1	E	9A2a Identify the solutions of a linear equation in two variables (*x, y*) as a straight line, including where *x* or *y* is a constant i.e. the equation has only one variable.	2

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses basic knowledge of pair of linear equation in two variables

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question

1 Ravi took a cab to go to his office. The cab fare is as follows:

For the first kilometre, the fare is Rs 50 and for the subsequent distance it is Rs 10 per kilometre.

Take the distance covered as x km and total fare as Rs y, form a linear equation in two variables.

If Ravi covered 7 km then how much fare he has to pay?

(2 marks)

(Total marks 2)

Mark scheme

Ravi took a cab to go to his office. The cab fare is as follows: for the first kilometre, the fare is Rs 50 and for the subsequent distance it is Rs 10 per kilometre. Take the distance covered as x km and total fare as Rs y, form a linear equation in two variables. If Ravi covered 7 km then how much fare he has to pay?	
Answer	Guidance
Total distance = x km Total fare = Rs y Fare for first km = Rs 50 According to the question 50 + (x -1) 10 = y 50 + 10x -10 = y 10x – y + 40 = 0 …….(i) Now if total distance is 7 km Total fare = $10 \times 7 + 40 = y$ Or y = 70 +40 Y = Rs 110	M1 For forming correct equation A1 For the correct amount Don’t cut marks if Rs is not written in final answer.

Maths9DP9

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9DP9

*C = Calculator required, N = Calculator not allowed, E = Either

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP9	2	1	C	9A2a Identify the solutions of a linear equation in two variables (*x, y*) as a straight line, including where *x* or *y* is a constant i.e., the equation has only one variable.	3

Item purpose

This question assesses the ability of the student to solve the linear equation in two variables.

Sources and diagrams

Question

1 Find the value of 'm' if (-m, 3) is a solution of equation $4x + 9y - 3 = 0$. Show your working.

(3 marks)
(Total marks 3)

Mark scheme

1 Find the value of 'm' if (-m,3) is a solution of equation $4x + 9y - 3 = 0$. Show your working.	
Answer	Guidance
m=6 4(-m)+9(3)-3=0 OR -4m+27-3=0 m=24/4=6 m=6	M1 for substituting correct values M1 for correct calculation A1 for correct answer

Maths9CN2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9CN2	1		C	9A2b Solve problems from real life, including problems on Ratio and Proportion, using both algebraic and graphical methods.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses use the fact that the sum of the angles in a triangle is 180.

Sources and diagrams

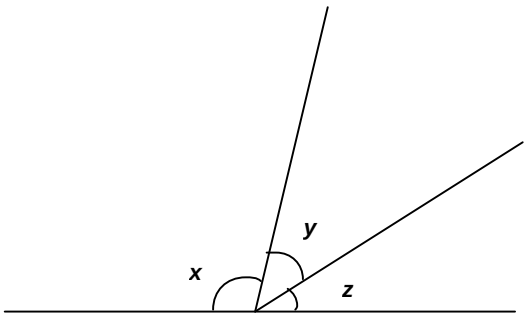


Diagram not drawn to scale

Question

1 In the given figure x, y, z are angles on a line such that $\frac{x}{y}$ =2 and $\frac{x}{z}$ = 3. Find the angles x, y, z rounded to the nearest degree.

A. 98, 49, 33
B. 99, 50, 31
C. 97, 33, 50
D. 98, 49, 32

(1 mark)

(Total marks 1)

Mark scheme

1 In the given figure x, y, z are angles on a line such that $\frac{x}{y}$ =2 and $\frac{x}{z}$ = 3. Find the angles x, y, z rounded to one decimal place. A. 98, 49, 33 B. 99, 50, 31 C. 97, 33, 50 D. 98, 49, 32	
Answer	Guidance
A. 98, 49, 33 x = 6a, y = 3a, z = 2a, 11a = 180, a = 16.36... x = 98, y = 49, z = 33	A1 For the correct answer No penalty to be imposed for 33, 49, 98 (any order).

Maths9NK2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NK2

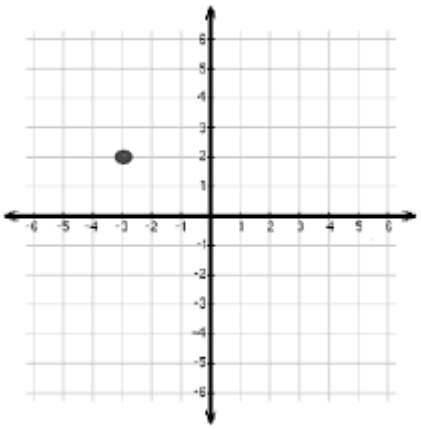
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NK2	1		E	9C1a Use standard notations and plot points in the plane.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the reflection of coordinates along x axis.

Sources and diagrams



Source information if copied: https://study.com/

Question

1 According to the diagram above, the dot represents Raily's school on the city map.

Marita's house is exactly at a mirror image of the school along the horizontal road represented in the diagram as the x axis.

Which of the following represents the coordinates of Marita's house?

A. (3, 2)
B. (–3, –2)
C. (3, -2)
D. (2, -3)

(1 mark)

(Total marks 1)

Mark scheme

1 According to the diagram above, the dot represents Raily's school on the city map. Marita's house is exactly at a mirror image of the school along the horizontal road represented in the diagram as x axis. Which of the following represents the coordinates of Marita's house? A. (3, 2) B. (–3, –2) C. (3, -2) D. (2, -3)	
Answer	Guidance
B. (–3, –2)	M1 – Coordinates of the school (-3,2) Reflection along x axis (-3,-2) as the reflected point will be in the third Quadrant A1 – 1 mark for correct answer

Maths9NK6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NK6

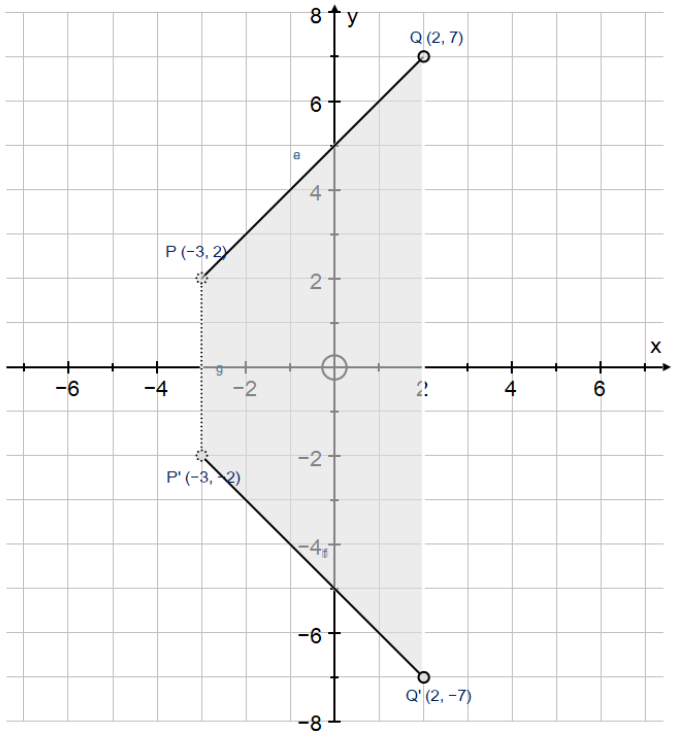
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NK6a	1		N	9C1a Use standard notations and plot points in the plane.	1
Maths9NK6b		3	N	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	3
Total marks	**1**	**3**			**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses reading of coordinates and applying the concept of mensuration and coordinate Geometry

Sources and diagrams



Question(s)

1

1 (a) What is the relationship between point P and point P' in the given graphical representation of the points? (1 mark)

1 (b) If the points P,P',Q,Q' are four corners of a cricket practice field, name the shape of the field and hence find the area of the field in square units. (3 Marks)

(Total marks 4)

Mark scheme

1 (a) What is the relationship between point P and point P' in the given graphical representation of the points?	
Answer	Guidance
Point Marking Looking at the graph P and P' are reflection points with respect to x axis P and P' are mirror images with respect to x axis	M1- P and P' are reflection points with respect to x axis M2 - P and P' are mirror images with respect to x axis Correct Answer – 1 mark
1 (b) If the points P,P',Q,Q' are four corners of a cricket practice field , name the shape of the field and hence find the area of the field in square meters.	
Answer	Guidance
Point Marks The shape of the field is Trapezoid Area of Trapezoid = (Average of parallel sides) * Height of the trapezoid.	M1 – Step 1 - Identification of shape – Trapezoid /Trapezium – 1 mark Step 2 - Formula of Area – $(a +b)/2 *h$ Step 3 – Deduce the measurement from the graph for 2 sides (counting the squares) between P-P' and Q-Q'

From the graph: Side 1 (P-P') = 4 units Side 2 (Q-Q') = 14 units Distance between two sides / height of the trapezoid = 5 units Area = (4 + 14)/2 * 5 Area = 9 * 5 = 45 units	And horizontal distance between the sides /height =5 units A1- 3 marks A2 – If the shape is correctly identified and measurements are also correct but calculation error. - 2 marks A3 – If only shape identified but formula and measurements are incorrect - 1 mark M2 – Identification of shape - Trapezoid Counting of squares within the shape – approximately 90 squares. A1- 3 marks

Maths9NM7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM7

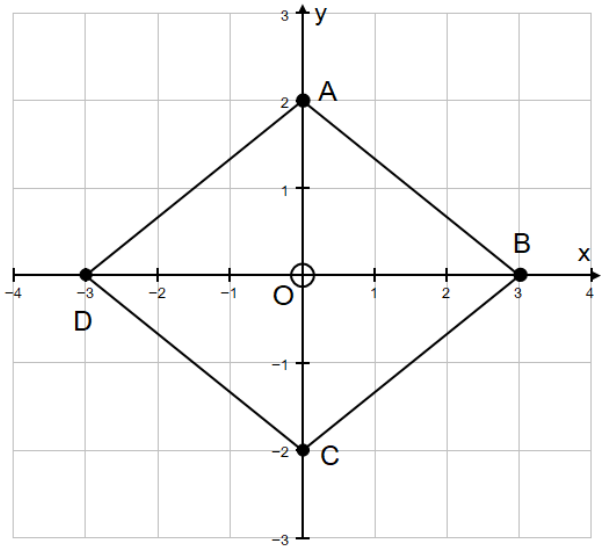
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM7a	1		E	9C1a Use standard notations and plot points in the plane.	1
Maths9NM7b	2	1	E	9G4e Use the fact that: In a parallelogram, the diagonals bisect each other and conversely.	3
Total marks	**3**	**1**			**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of plotting the points on rectangular coordinate plane, the use of basic characteristic of a rhombus and the use of mensuration- concept such as area of a right angled triangle=1/2 (product of two perpendicular sides) in coordinate geometry.

Sources and diagrams



Question(s)

1 Given points are A (0,2), B (3,0), C (0,-2) and D (-3,0)

1 (a) Plot the points A, B, C and D on a graph

(1 mark)

1 (b) Name the figure ABCD obtained by joining the points, and find the area of the figure ABCD.

(3 marks)

(Total marks 4)

Mark scheme

1 (a) Plot the points A, B, C and D on a graph.	
Answer	Guidance
Point Marking Plot the points (0,2), (3,0), (0,-2) and (-3,0) on a graph paper as shown on the diagram above. (1)	MA 1- 1 mark for plotting the points on a graph paper. A1-1 mark for correct plotting of the points.
1 (b) Name the figure ABCD obtained by joining the points, and find the area of the figure ABCD.	
Answer	Guidance
Join the points A (0,2), B(3,0), C(0,-2) and D(-3,0). The figure so obtained is a Rhombus. (Using the property: Diagonals of a rhombus bisect each other at right angle)	M1 – Joining the points and identifying the figure so obtained. 1 mark M1 – Identifying the symmetry of the 4 right angled tringles within the rhombus and area

Area of the rhombus= $4\times\frac{1}{2}(OB\times OA)$ = 2(3×2)=12 square units, where O(0,0) refers to origin in the graph. Final answer= 12 square units.	of the rhombus = 4×Area of one of the triangles - 1 mark M2- Area of the rhombus= $4\times\frac{1}{2}(OB\times OA)$ 2(3×2)=12 square units, where O(0,0) refers to origin in the graph. Simplification and final answer- 1 mark A2- 3 marks

Maths9IM3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	IX	Maths9IM3

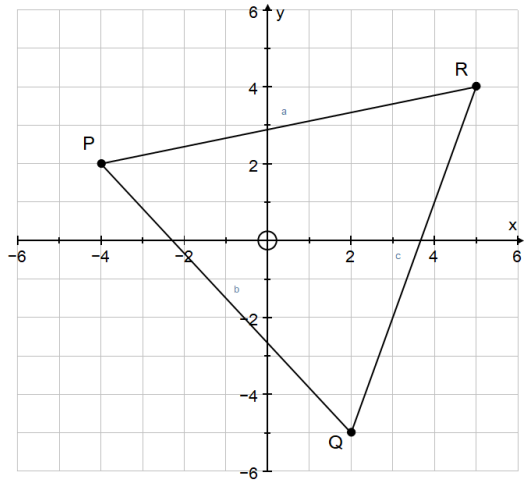
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM3	1		E	9C1a use standard notations and plot points in the plane.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the strategy to locate points in a Cartesian plane

Sources and diagrams



Question

1 Identify the coordinates of point Q.

A. Q (2, 5)
B. Q (-2, 5)
C. Q (-2, -5)
D. Q (2, -5)

(1 mark)

(Total marks 1)

Mark scheme

1 Identify the coordinates of point Q. A. Q (2, 5) B. Q (-2, 5) C. Q (-2, -5) D. Q (2, -5)	
Answer	Guidance
D. (2, -5) (1)	M1 for choosing correct option. Accept d), d, (2, -5)

Maths9GB2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9GB2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9GB2	1		E	9C1a Use standard notations and plot points in the plane.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to interpret and write correct coordinates of a point

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 In a Cartesian plane, what are the coordinates of a point P that is 3 units to the left of origin and 2 units below the origin?

A. (3, 2)
B. (-3, 2)
C. (-3, -2)
D. (3, -2)

(1 mark)

(Total marks 1)

Mark scheme

1 In a Cartesian plane, what are the coordinates of a point P that is 3 units to the left of origin and 2 units below the origin? A. (2, 3) B. (-2, 3) C. (-2, -3) D. (2, -3)	
Answer	Guidance
C. (-3, -2) (1)	A1 – Correct answer only

Maths9AG5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AG5

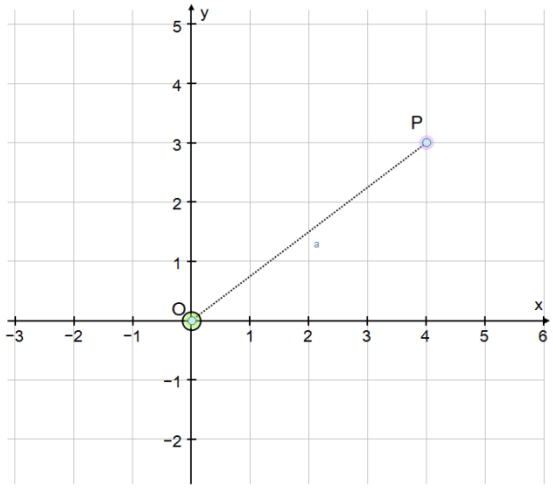
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AG5a	1		N	9C1a Use standard notations and plot points in the plane	1
Maths9AG5b		2	E	9C1a Use standard notations and plot points in the plane	2
Total marks	**1**	**2**			**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the concept of coordinate geometry and its use in real life world.

Sources and diagrams



Question

1 In a Cartesian plane a child is standing at certain point P and his mother is standing at a point O. The coordinates of point O are (0,0)

1(a) What are the coordinates of the child?

(1mark)

1(b) What is the distance between the child and his mother?

(2mark)

(Total marks 3)

Mark scheme

1 (a) What are the coordinates of the child?	
Answer	Guidance
(4,3)	A 1 (4,3)
1 (b) What is the distance between the child and his mother?	
Answer	Guidance
5 unit	M 1 Distance = $\sqrt{x^2 + y^2}$ A 1 Distance = $\sqrt{25} = 5\ unit$

Maths9JJ2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9MJJ2	1		N	9C1a Use standard notations and plot points in the plane.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of student to identify the position of a point in a coordinate plane

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 In which quadrant does the point (-7, -9) lie?

A. I Quadrant
B. II Quadrant
C. III Quadrant
D. IV Quadrant

(1 mark)

(Total marks 1)

Mark scheme

1 In which quadrant does the point (-7, -9) lie?	
Answer	Guidance
III Quadrant	1 Mark for the correct answe

Maths9RS1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS1

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS1	1		E	9C1a Use standard notations and plot points in the plane.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses basic knowledge of coordinate geometry

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question

1 Coordinate of a point A $(\frac{13}{2}, 5)$ and B $(4, -\frac{2}{13})$.

The value of (abscissa of A) – (ordinate of B) is:

A. $\frac{165}{26}$

B. $-\frac{165}{26}$

C. $\frac{173}{26}$

D. $-\frac{173}{26}$

(1 mark)

(Total mark 1)

Mark scheme

1 The coordinates of two points are A $(\frac{13}{2}, 5)$ and B $(4, -\frac{2}{13})$. The value of (abscissa of A) – (ordinate of B) is	
Answer	Guidance
C. $\frac{173}{26}$	A1 For correct answer

Maths9SK4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9SK4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9SK4	1		N	9C1a Use standard notations and plot points in the plane.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of co-ordinate geometry

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question

1 The mid-point of the line segment joining the points A(-2,8) and B(-6,-4) is

A. (-4,-6)
B. (2,6)
C. (4,2)
D. (-4,2)

(1 mark)

(Total mark 1)

Mark scheme

1 The mid-point of the line segment joining the points A(-2,8) and B(-6,-4) is A. (-4,-6) B. (2,6) C. (4,2) D. (-4,2)	
Answer	Guidance
D (-4,2)	A1 for correct answer

Maths9RM4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RM4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RM4	1		C	9C1a Use standard notations and plot points in the plane.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses finding the midpoint coordinates

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 The midpoint of the line segment joining the points P(0,6) and Q(4,0)is given by:

A. (0,0)
B. (2.3)
C. (3,2)
D. (4,6)

(1 mark)

(Total marks 1)

Mark scheme

1 The midpoint of the line segment joining the points P(0,6) and Q(4,0)is given by: A. (0,0) B. (2.3) C. (3,2) D. (4,6)	
Answer	Guidance
B. (2,3)	A 1 for correct answer.

Maths9DP5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9DP5

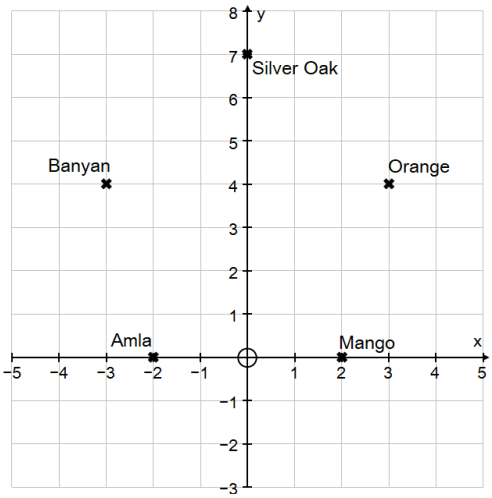
*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP5	2		E	9C1a Use standard notations and plot points in the plane.	2

The question assesses the ability of the student to understand the names and terms associated with the coordinate plane and to locate the coordinates of a point.

Sources and diagrams



Question

1 On environment day, class-9 students got five plants of mango, silver oak, orange, banyan and amla from soil department. Students planted the plants and noted their locations as (x, y). Observing the graph given above, answer the following question:

Find the coordinates of location point of orange tree. Also write that in which quadrant do these coordinates lie?

(2 marks)

(Total marks 2)

Mark scheme

1 Find the coordinates of location point of orange tree. Also write that in which quadrant do these coordinates lie?	
Answer	Guidance
(3, 4) 1st quadrant	A1 A1

Maths9RS2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS2

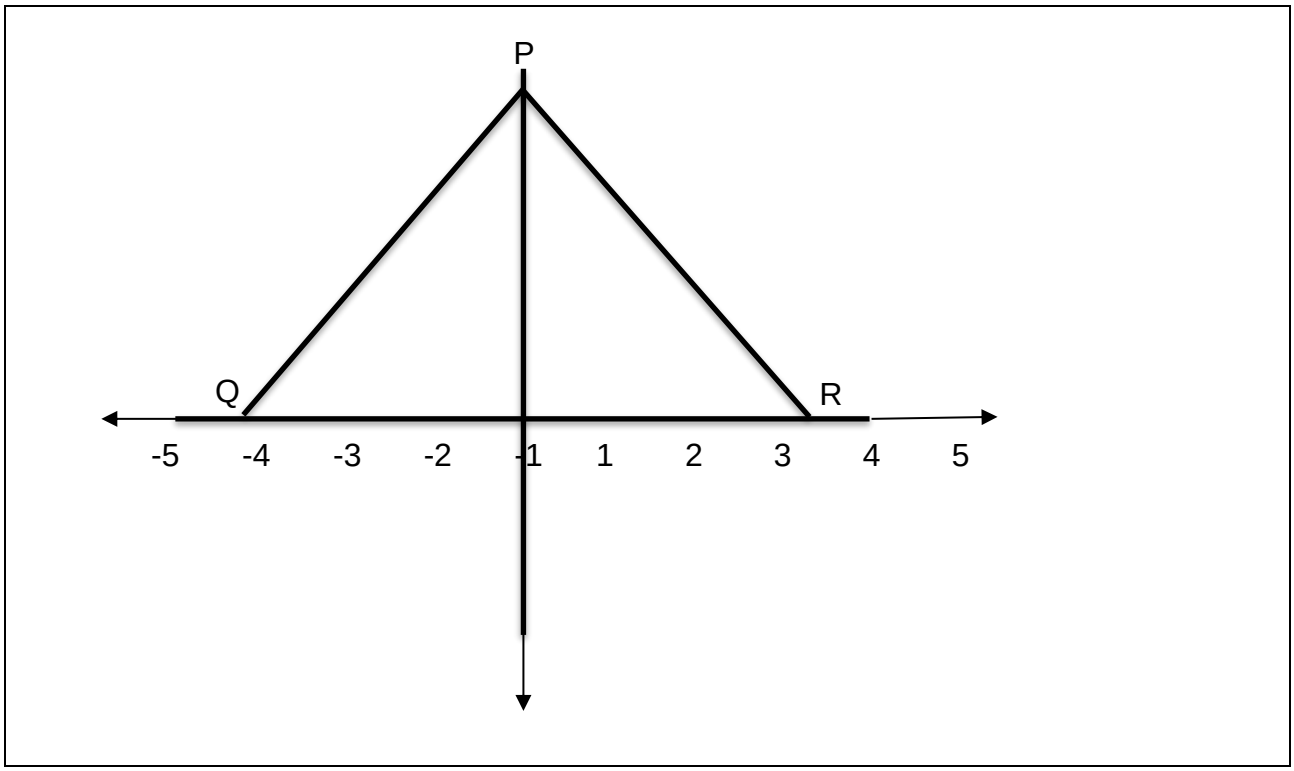
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS2	2		E	9C1a Use standard notations and plot points in the plane.	2

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses basic knowledge of coordinate geometry

Source(s)



Question(s)

1 PQR is an equilateral triangle.

Coordinates of Point Q and R are $(-4,0)\ and (4,0)$ respectively.

Find the coordinate of point P.

(2 marks)

(Total marks 2)

Mark scheme

1 PQR is an equilateral triangle. Coordinates of Point Q and R are $(-4,0)\ and (4,0)$ respectively. Find the coordinate of point P.	
Answer	Guidance
As PQR is an equilateral triangle So PQ= QR = PR From figure QR = 8 unit PQ= PR = 8 unit Let point of intersection of both axis is O. In triangle POR, using Pythagoras theorem $PR^2 = PO^2 + OR^2$ $8^2 = PO^2 + 4^2$ $PO^2 = 64 - 16$ $= 48$ PO = $\sqrt{48} = 4\sqrt{3}$ unit Coordinate of point P = (0, $4\sqrt{3}$)	M1 For using Pythagoras theorem A1 For writing correct coordinates. Can consider coordinate as (0, $\sqrt{48}$) also.

Maths9JJ6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ6

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ6	3		N	9C1a Use standard notations and plot points in the plane. 8M2a Find the area of a trapezium	3

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the students to construct and interpret bar graphs.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

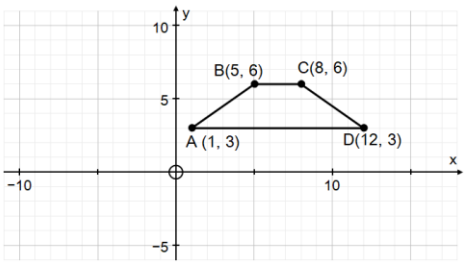
1 Find the area of the polygon obtained by joining the points (1, 3), (5, 6), (12, 3), and (8, 6) on coordinate plane.

(3 marks)

(Total marks 3)

Mark scheme

1 Find the area of the polygon obtained by joining the points (1, 3), (5, 6), (12, 3), and (8, 6) on coordinate plane.	
Answer	Guidance

21 square units  	M1-for plotting the points correctly and labelling. Don't penalize if the student didn't label the points as A, B, C, D. M2- joining the points and identifying that it is a trapezium. A1-for finding area of trapezium as 21 square units Don't penalize if square units is not mentioned.

Maths9SM8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9SM8

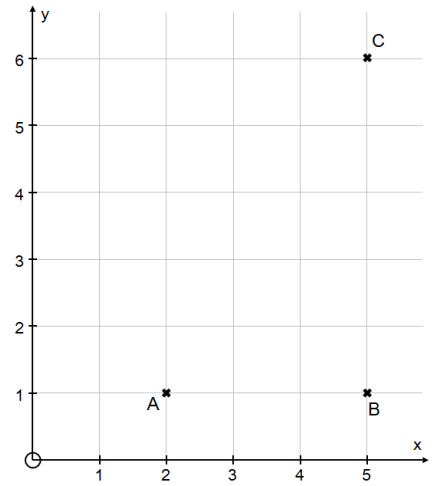
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9SM8a	1	1	N	9C1a Use standard notations and plot points in the plane.	2
Maths9SM8b	1	1	N	9C1a Use standard notations and plot points in the plane.	2
Total marks	2	2			4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the correct location of point on the cartesian plane.

Sources and diagrams



Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 Observe the above given grid and answer the following questions:

(a) Find the sum of abscissa of coordinates of A and B.

(2 marks)

If ABCD represents the vertices of a rectangle.

Plot the point D and write its coordinates.

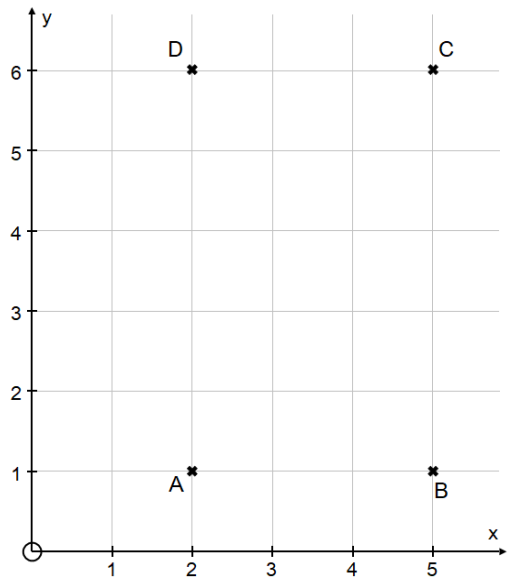
(2 marks)

1(b)

(Total marks 4)

Mark scheme

1 (a) Find the sum of abscissa of coordinates of A and B.	
Answer	Guidance
Abscissa of A = 2 Abscissa of B = 5 (1) Sum =7 (1)	M1 for correct identification of abscissas. A1 for correct answer.
1 (b) If ABCD represents the vertices of a rectangle. Plot the point D and write its coordinates.	
Answer	Guidance
Plotting of D in grid. (1)	A1 for plotting correct point. A1 for writing correct coordinate.



Coordinate of D = (2,6) (1)

Maths9AN5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN5	3	2	N	9C1a Use standard notations and plot points in the plane.	5

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to solve for a given coordinate and identify its quadrant.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 If the coordinates of a point M are (-2,9), which can also be expressed as (1+s, t^2) and t > 0, then find the coordinates of P (2s, -3t) and Q (s^2, 1-t).

Also find which quadrants these points lie in.

(5 marks)

(Total marks 5)

Mark scheme

1 If the coordinates of a point M are (-2,9), which can also be expressed as (1+s, t^2) and t > 0, then find the coordinates of P (2s, -3t) and Q (s^2, 1-t). Also find which quadrants these points lie in.	
Answer	Guidance
P (-6, -9) lies in III quadrant Q (9, -2) lies in IV quadrant 1+s = -2, so s = -3 t^2 = 9, so t = 3 (ignore -3 since t>0) Hence s = -3, t = 3 So, the point P is (-6, -9) P lies in the III quadrant Q (s^2, 1 - t) The point Q is (9, -2) Q lies in the IV quadrant	M2: Correctly identifying s and t A1: Correct mention of coordinates of P. A1: Correct mention of coordinates of Q. A1: Correct mention of A1: Correct mention of III quadrant for P and IV quadrant for Q

Maths9SM3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9SM3

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9SM3	1		N	9G2a Identify and calculate with vertically opposite angles when two lines intersect, and corresponding, alternate and interior angles when a transversal intersects two parallel lines.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the identification of sum of co-interior angles as supplementary and hence lines are parallel.

Sources and diagrams

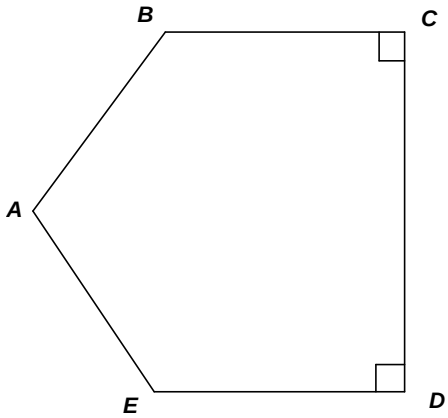


Diagram not to scale

Question

1 Observe the figure and state which lines are parallel.

(1 mark)

(Total marks 1)

Mark scheme

1 Observe the figure and state which lines are parallel?	
Answer	Guidance
BC and ED (1)	M1 for correct answer

Maths9CN1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN1

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9CN1	1		C	9G2a Identify and calculate with vertically opposite angles when two lines intersect, and corresponding, alternate and interior angles when a transversal intersects two parallel lines.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to find supplementary angles.

Question

1 An angle is equal to one fourth of its supplement. Its measure is:

A. 60°
B. 30°
C. 18°
D. 36°

(1 mark)

(Total marks 1)

Mark scheme

1 An angle is equal to one fourth of its supplement. Find its measure?
A. 60°
B. 30°
C. 18°
D. 36°

Answer	Guidance
D. 36° x + 4x = 180, so 5x = 180, x = 36	A1 For the correct answer Alternate answer to be accepted: 36

Maths9BS1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9BS1

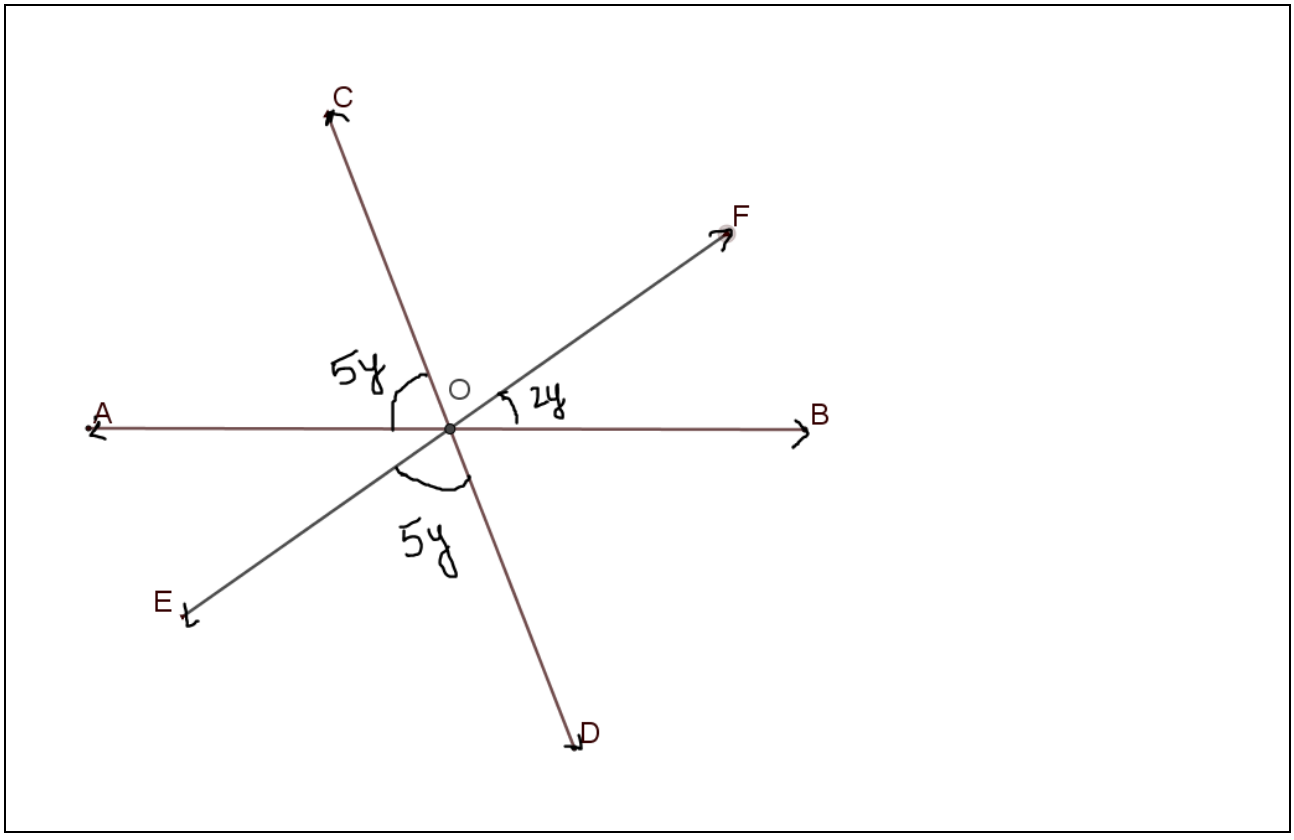
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9BS1	1		N	9G2a Identify and calculate with vertically opposite angles when two lines intersect	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of intersecting lines, Vertically opposite angles.

Sources and diagrams



Question

1 In the figure above, find the value of y

A. 60
B. 45
C. 30
D. 15

(1 mark)

(Total marks 1)

Mark scheme

1 In the figure above, find the value of y A. 60 B. 45 C. 30 D. 15	
Answer	Guidance
D. 15	A1: Correct answer or option

Maths9LK1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK1

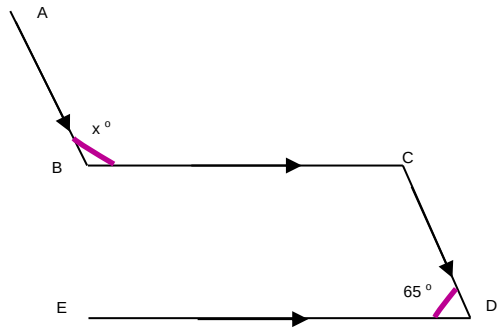
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK1	1		N	9G2a Identify and calculate with vertically opposite angles when two lines intersect, and corresponding, alternate and interior angles when a transversal intersects two parallel lines.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the student to use properties of parallel lines in a simple context.

Source(s)



Not to scale

Question(s)

1 In the given figure, AB ∥ CD and BC ∥ ED. Find the value of x

A. 115^0
B. 65^0
C. 25^0
D. none of these

(1 mark)

(Total marks 1)

Mark scheme

1 In the given figure, AB ∥ CD and BC ∥ ED. Find the value of x A. 115^0 B. 65^0 C. 25^0 D. none of these (1 mark)	
Answer	Guidance
B. 65^0	A1 – to write correct answer

Maths9MS6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9MS6

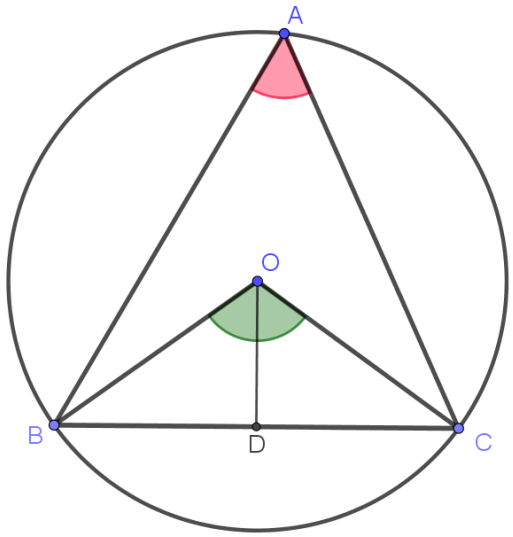
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9MS6a	1		N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	1
Maths9MS6b	2		N	9G2a Classify angles: acute, right angled, obtuse, reflex	2
Maths9MS6c		3	N	9G6b Be able to use the fact that: The perpendicular from the centre of a circle to a chord bisects the chord and conversely, the line drawn through the centre of a circle to bisect a chord is perpendicular to the chord.	3
Total marks	**3**	**3**			**6**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses knowledge about the angle made by arcs and properties of chord of a circle

Sources and diagrams



Not to scale

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 The angle subtended by an arc BC of a circle cantered at O is $2\alpha + 50°$.

1 (a) Find $\angle BAC$ in terms of α.

(1 mark)

1 (b) If $\alpha = 30°$, find the reflex angle of $\angle BOC$

(2 marks)

1 (c) If the length of the chord of the circle AB = 16 cm and is at the distance of 15 cm from the centre of the circle, then find the radius of the circle

(3 marks)

(Total marks 6)

Mark scheme

1 (a) Find $\angle BAC$ in terms of α.	
Answer	Guidance
$\alpha + 25°$	A1 1 mark for correct answer Mark may be awarded if degree symbol is missing

1 (b) If $\alpha = 30°$, find the reflex angle of $\angle BOC$	
Answer	Guidance
250°	M1 Finding $\angle BOC$ M1 Finding the reflex angle of $\angle BOC$ A1 $\angle BOC = 110°$ - 1 Mark A2: Reflex of $\angle BOC = 360°-110° = 250°$ - 1 Mark Mark may be awarded if degree symbol is missing
1 (c) If the length of the chord of the circle AB = 16 cm and is at the distance of 15 cm from the centre of the circle, then find the radius of the circle	
Answer	Guidance
17 cm	M1 Finding BD M1 Finding OB=OA = r using Pythagorean Theorem A1: BD = 8 cm – 1 Mark A2 : OA = OB = 17 cm – 2 Marks

Maths9NK8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NK8

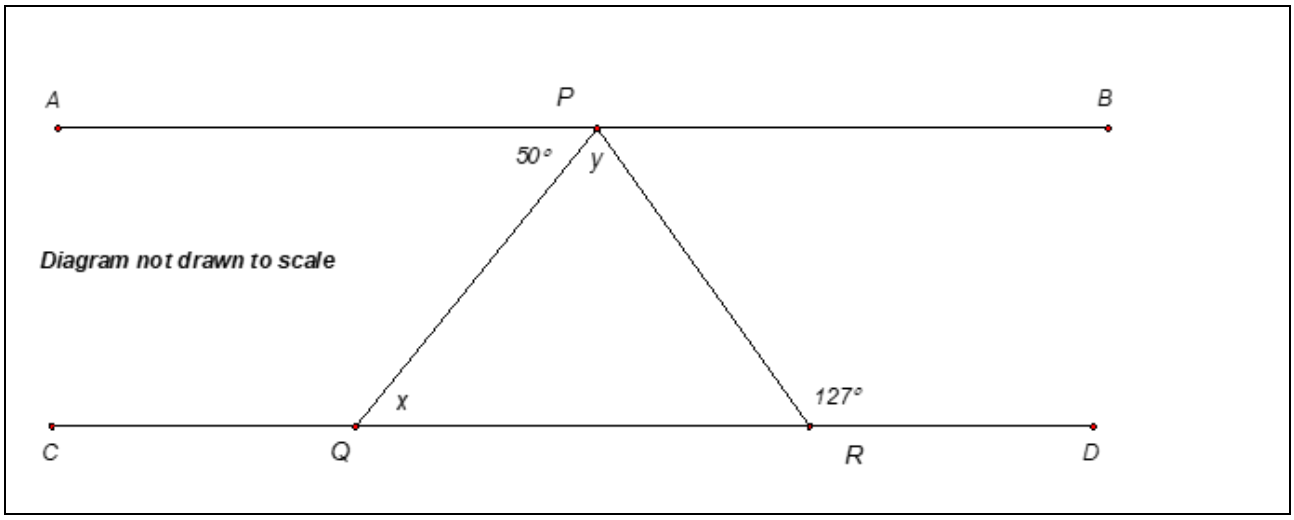
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NK8a	1		N	9G2c Know and use that if a side of a triangle is produced, the exterior angle formed is equal to the sum of the two interior opposite angles.	1
Maths9NK8b	3		N	9G2a Identify and calculate with vertically opposite angles when two lines intersect, and corresponding, alternate and interior angles when a transversal intersects two parallel lines.	3
Total marks	**4**				**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses properties of parallel lines, and triangles

Sources and diagrams



Question(s)

1

1 (a) State the relationship between angle ‘x’, ‘y’ & 127°.

(1 mark)

1 (b) Find the measures of all angles of the ΔPQR in the above figure if the two lines AB and CD are parallel.

(3 marks)

(Total marks 4)

Mark scheme

1 (a) State the relationship between angle ‘x’, ‘y’ & 127°	
Answer	Guidance
In ΔPQR $x + y = 127^\circ$ Exterior angle property of triangles	MA 1- By exterior angle property $x+y = 127^\circ$ A1 – Correct relation – 1 mark
1 (b) Find the measures of all angles of the ΔPQR in the above figure if the two lines AB and CD are parallel	
Answer	Guidance
Point Marks If AB and CD are parallel then: $X = 50^\circ$ - Alternate angles are equal when lines are parallel and PQ is the transversal $50^\circ + y = 127^\circ$ - Alternate angles are equal when lines are parallel and PR is the transversal $y = 127^\circ - 50^\circ = 77^\circ$ Third Angle $z = 180^\circ – (77 + 50) = 53^\circ$	M1 – Use of alternate interior angle and the property of parallel lines with two different transversals and angle sum property $x = 50^\circ, y = 77^\circ$ $z = 53^\circ$ A1 = 3 marks A2 – 2 marks (two angles are correct and one is incorrect) A3 – 1mark (one is correct) A4 – Zero if all incorrect M2 – Use of alternate interior for x , Linear pair for z, angle sum property for y)

Maths9NM8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM8

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM8a	1	1	E	9G2a Identify and calculate with vertically opposite angles when two lines intersect, and corresponding, alternate and interior angles when a transversal intersects two parallel lines.	2
Maths9NM8b	2	1	E	9G2a Identify and calculate with vertically opposite angles when two lines intersect, and corresponding, alternate and interior angles when a transversal intersects two parallel lines.	3
Total marks	**3**	**2**			**5**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses

- *the ability of identifying and applying the concept of linear pair of angles, Vertically opposite angles.*

Sources and diagrams

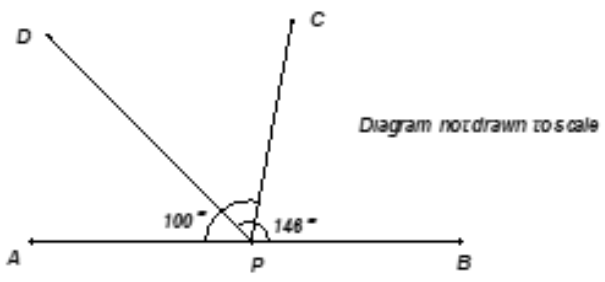


Fig 1

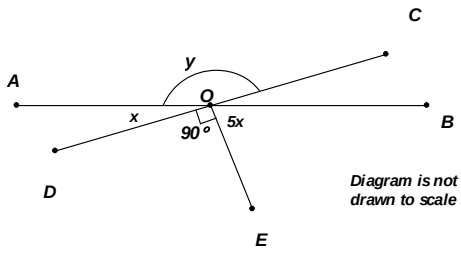


Fig 2

Question(s)

1

1 (a) 1 (a) In figure 1 (given above) $\angle APC = 100^0$ and $\angle BPD = 146^0$. Find $\angle CPD$

(2 marks)

1 (b) In figure 2 (Given above) if AB and CD are straight lines intersecting at O and OE is perpendicular to CD, find the values of angles x and y.

(3 marks)

(Total marks 5)

Mark scheme

1 (a) In figure 1 (given above), $\angle BPC + \angle CPD = 146^0$ and $\angle APD + \angle CPD = 100^0$ Find $\angle CPD$	
Answer	Guidance
Point Marking Let $\angle CPD = x^0$ • $\angle BPC = 146^0 - x^0$ • $\angle APD = 100^0 - x^0$ • $\angle BPC + \angle APD + x^0 = 180^0$ • $146^0 - x^0 + 100^0 - x^0 + x^0 = 180^0$ • $x = 66^0$ (1) (**Using the concept of Linear pair Axiom**)	M 1- Use of the Linear pair Axiom concept (can be implied) A1-1 mark for correct answer. Correct answer only 2 marks.
1 (b) In figure 2 (Given above) if AB and CD are straight lines intersecting at O and $\angle DOE = 90^0$, then find the values of angles x, y and z.	
Answer	Guidance
$\angle DOE + x + 5x = 180^0$ $90 + 6x = 180^0$ $x = 15^0$	M1 – Use of the Linear pair Axiom concept To find the value of x

(Use of the Linear pair Axiom concept) • $y+x=180^0$ $15^0+y=180^0$ $y=165^0$ (1) (Use of the Linear pair of angles)	A1 – 1 mark for correct answer (x= 15^0) Correct answer only 2 marks. Use of the concept of linear pair of angles, Simplification and final answer $Z=165^0$ A1-1 mark for correct answer.

Maths9BS7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9BS7

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9BS7a	1	1	N	9G4c Use the fact that: In a parallelogram opposite angles are equal, and conversely 9G2a Identify and calculate with vertically opposite angles when two lines intersect, and corresponding, alternate and interior angles when a transversal intersects two parallel lines.	2
Maths9BS7b		5	N	9G4d Use the fact that: A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal. 9G4b Use the fact that: In a parallelogram opposite sides are equal, and conversely.	5
Total marks	**1**	**6**			**7**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of the properties of a Parallelogram.

Sources and diagrams

Diagram 1(a)

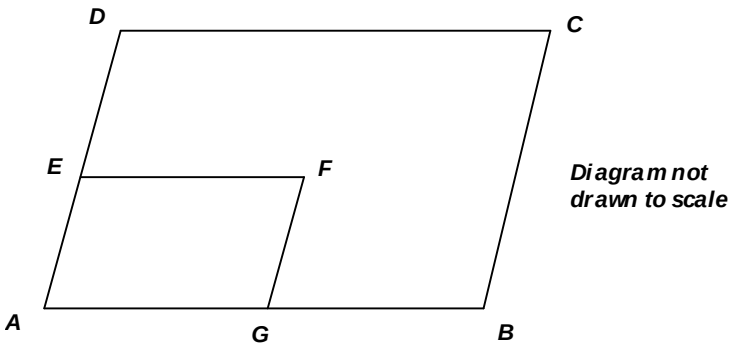
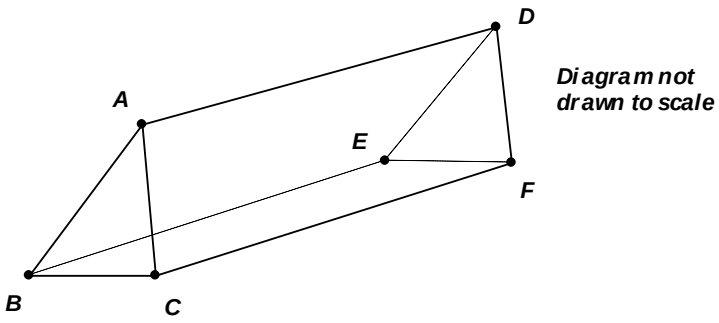


Diagram 1 (b)



Question(s)

1

1 (a) In the diagram 1(a), ABCD and AEFG are two parallelograms.

If $\angle BCD = 75^{o}$, determine $\angle AGF$

(2 marks)

1 (b) In diagram 1(b) , AB || DE, AB = DE, AC || DF and AC = DF.
Prove that BC || EF and find the value of EF, if BC = 4cm.

(5 marks)

(Total marks 7)

Mark scheme

1 (a) In the diagram 1(a), ABCD and AEFG are two parallelograms. If ∠BCD = 55º, determine ∠AGF	
Answer	Guidance
∠AGF=105°	M1 : Opposite angles of a parallelogram are equal ∠A =∠C=75 ∠A= ∠F =75 ∠F+∠G=180 A1: ∠G= 105° Alternative method of property of parallel lines can be considered too.
1 (b) In diagram 2 , AB || DE, AB = DE, AC || DF and AC = DF. Prove that BC || EF and find the value of EF, if BC =4cm.	
Answer	Guidance
The value of EF = 4cm	M1: AB || DE, AB = DE, (Given) ∴ ABED is a parallelogram. (Opposite sides are parallel and equal) M1: AD=BE and AD II BE ….(1) M1: AC || DF and AC = DF (Given) ∴ ACFD is a parallelogram. (Opposite sides are parallel and equal) ∴AD=CF and AD II CF …….(2) M1: From (1) and (2) BE =CF , BE II CF ∴BEFC is a Parallelogram. A 1: BC II EF (opposite sides of a Parallelogram are equal) BC= EF BC =EF = 4 cm

Maths9IM1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM1

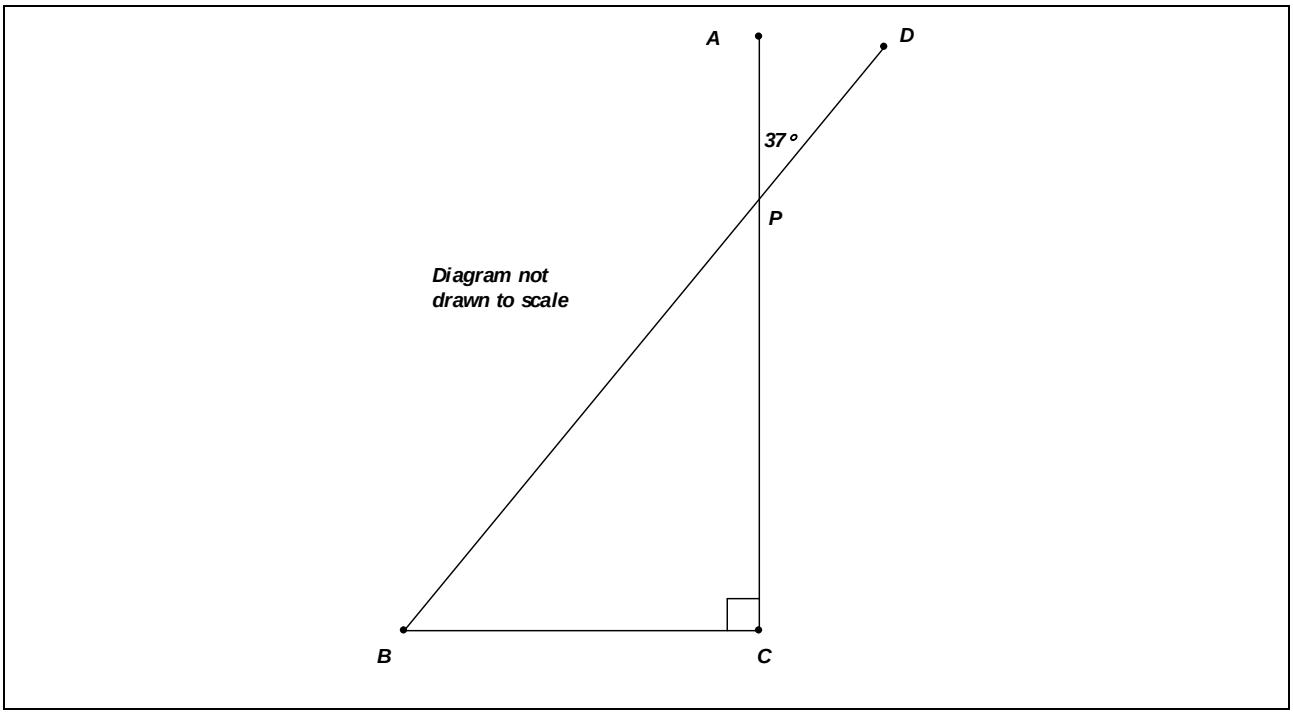
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM1		1	N	9G2b Be able to prove, and use the fact that the sum of the angles in a triangle is 180^o	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of mathematical statements particularly related to geometrical concepts of lines and triangles.

Sources and diagrams



Question

1 Find the measure of $\angle PBC$

A. 37^0
B. 53^0
C. 57^0
D. 63^0

(1 mark)

(Total marks 1)

Mark scheme

1 Find the measure of the indicated angle.	
Answer	Guidance
B. 53^0 (1)	M1 for choosing correct option. Accept b), b, 53, 53^0

Maths9MS4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9MS4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9MS4	1		N	9G2b Be able to prove, and use the fact that the sum of the angles in a triangle is 180^0.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the result on angles of a triangle

Sources and diagrams

Question

1 The angles of a triangle are in the ratio 3 : 5 : 7. The smallest angle of the triangle is

A. 12°
B. 36°
C. 60°
D. 84°

(1 mark)

(Total marks 1)

Mark scheme

1 The angles of a triangle are in the ratio 3 : 5 : 7. The smallest angle of the triangle is A. 12° B. 36° C. 60° D. 84°	
Answer	Guidance
B. 36°	A1 For Correct answer

Maths9LK5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK5	2		N	9G2b Be able to prove, and use the fact that the sum of the angles in a triangle is 180^0.	2

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use angle sum property of a triangle

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question(s)

1 If the angles of a triangle are $(x - 40^0)$, $(x - 20^0)$ and $(\frac{x}{2} - 10^0)$ then find the value of x. Give your answer in degrees.

(2 marks)

(Total marks 2)

Mark scheme

1 If the angles of a triangle are $(x - 40^0)$, $(x - 20^0)$ and $(\frac{x}{2} - 10^0)$ then find the value of x. Give your answer in degrees.	
Answer	Guidance
$x = 100^0$ $(x - 40^0) + (x - 20^0) + (\frac{x}{2} - 10^0) = 180^0$ $\frac{5x}{2} - 70^0 = 180^0$ $\frac{x}{2} = 50^0 \Rightarrow x = 100^0$	M1 to use the angle sum property of a triangle. A1 to find the correct value of x.

Maths9BS6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9BS6

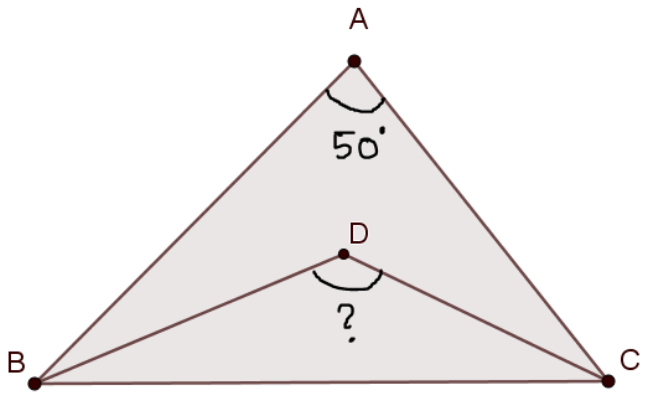
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9BS6a	3		N	9G2b Be able to prove, and use the fact that the sum of the angles in a triangle is 180^0.	3
Maths9BS6b		4	N	9G2b Be able to prove, and use the fact that the sum of the angles in a triangle is 180^0.	4
Total marks	**3**	**4**			**7**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the properties of a triangle

Sources and diagrams



Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 (a) Angles of a triangle are in the ratio 2:4:3. What is the smallest angle?

(3 marks)

1 (b) In the figure above, the bisectors of angles B and C of a triangle ABC and intersect each other at the point D and $\angle A = 50°$. Find the value of $\angle BDC$.

(4 marks)

(Total marks 7)

Mark scheme

1 (a) Angles of a triangle are in the ratio 2 : 4 : 3. What is the smallest angle?	
Answer	Guidance
Smallest angle is 40°	M1 : Taking common ratio as x and M1: using the property of sum of interior angles of a triangle is 180° and finding x 2x+4x+3x = 180° 9x = 180° x=20° A1: Finding the smallest angle 2x = 40°
1(b) Bisectors of angles B and C of a triangle ABC and intersect each other at the point D and $\angle A = 50°$. Find the value of $\angle BDC$	
Answer	Guidance
The value of $\angle BDC = 115°$	M1: In Δ ABC, $\angle A + \angle B + \angle C = 180$ $\angle A + 2\angle DBC + 2\angle DCB = 180°$ $2\angle DBC + 2\angle DCB = 180° - \angle A$

	$\angle DBC+ \angle DCB =90°- \frac{1}{2}\angle A$….(1) M1: In ΔBDC $\angle BDC+ \angle DBC+ \angle DCB =180$….(2) Substituting (1) in (2) M1: $\angle BDC +90°- \frac{1}{2}\angle A =180$ $\angle BDC +90°- \frac{1}{2}\times 50=180$ A1: $\angle BDC= 115°$ Children can adopt any other correct method too. But the basic property Sum of angles of a Triangle is 180° should be used.

Maths9MS3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9MS3

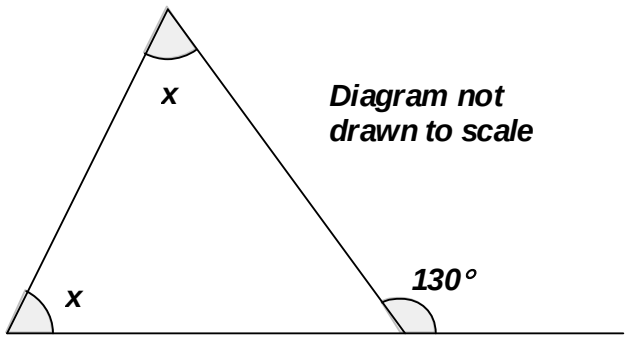
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9MS3	1		N	9G2c Know and use that if a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of the result on exterior angle of a triangle

Sources and diagrams



Question

1 An exterior angle of a triangle is 130° and the two interior opposite angles are equal. Find each of these angles

(1 mark)

(Total marks 1)

Mark scheme

1 In the above diagram an exterior angle of a triangle is 130° and the two interior opposite angles are equal. Find each of these angles	
	Guidance
65°	A1 For Correct answer

Maths9LK6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK6

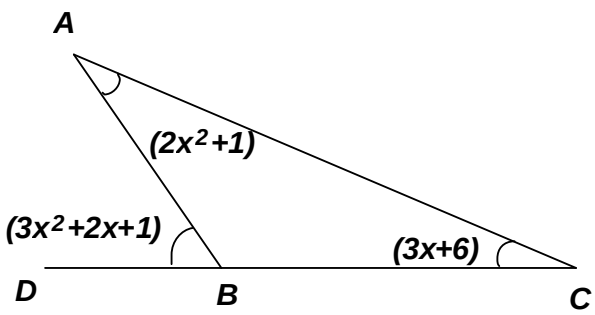
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK6a	2		N	9G2c Know and use that if a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.	2
Maths9LK6b	1		N	9G2c Know and use that if a side of a triangle is produced, the exterior angle so formed is equal to the sum of the two interior opposite angles.	1
Total marks	**3**				**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use exterior angle property of a triangle.

Source(s)



Question(s)

1 In the given figure $\angle ABD$ is an exterior angle of ΔABC.

1 (a) Find the value of x

(2 marks)

1 (b) Find the measure of $\angle ABC$

(1 mark)

(Total marks 3)

Mark scheme

1 (a) Find the value of x	
Answer	Guidance
x =3 Exterior angle of triangle is equal to sum of non-adjacent interior angles. Therefore $3x^2+2x+1 = 2x^2+1+3x+6$ $\Rightarrow x^2 - x - 6 = 0$ $\Rightarrow (x - 3)(x + 2) = 0$ $\Rightarrow x = 3, -2$ But x is not negative. x =3	M1 to use the properties of exterior of a triangle and to factorise. A1 to find the correct value of x.
1 (b) Find the measure of $\angle ABC$	
Answer	Guidance
146^0 $\angle ABD = 3x^2+2x+1$ Put x= 3 $\angle ABD = 27 + 6+1 = 34^0$ Therefore $\angle ABC = 180^0 - 34^0 = 146^0$	A1 to write correct value of $\angle ABC$.

Maths9CN3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN3

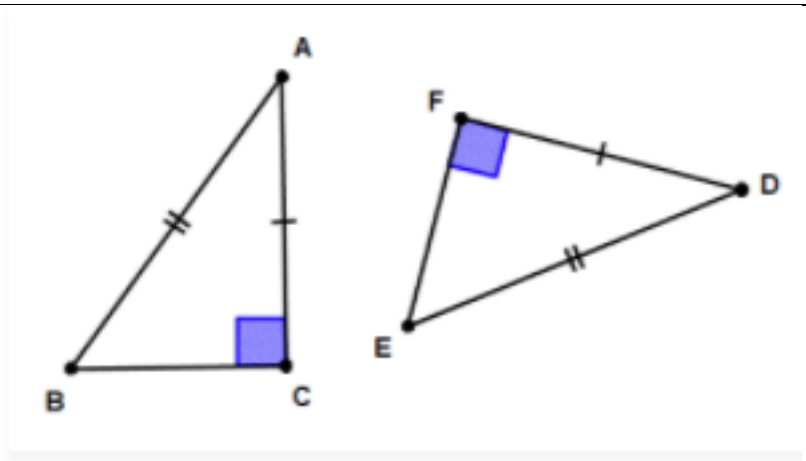
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9CN3	1		N	9G3d Use the fact that: Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle. (RHS Congruence)	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of RHS Criteria

Sources and diagrams



Source: Google

Question

1 In the given figure Δ ACB is congruent to Δ DFE by which rule.

A. SAS
B. SSA

C. RHS
D. ASA

(1 mark)

(Total marks 1)

Mark scheme

1 In the given figure ACB is congruent to DFE by which rule. A. SAS B. SSA C. RHS D. ASA	
Answer	Guidance
C. RHS	A1 For the correct answer Alternate answer to be accepted RHS

Maths9CN5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN5

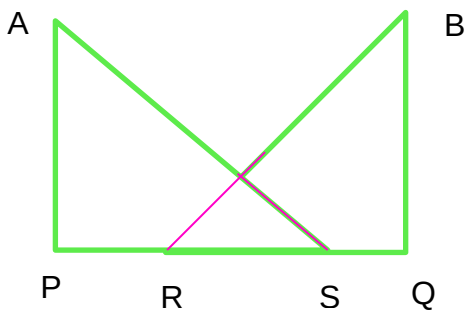
Item identity	AO1 marks	AO2 marks	C/N/E *	Content Reference(s)	Marks
Maths9CN5a		4	N	9G3d Use the fact that: Two right triangles are congruent if the hypotenuse and a side of one triangle are equal (respectively) to the hypotenuse and a side of the other triangle. (RHS Congruence)	4
Maths9CN5b		2	N	9G3f Use the fact that: The sides opposite to equal angles of a triangle are equal	2
Total marks		**6**			**6**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use the RHS criteria and the fact that the sides opposite to equal angles of a triangle are equal

Sources and diagrams



Question(s)

1 In the given figure, AP = BQ, PR = QS. ∠APS= ∠ BQR= 90°

Show that

1 (a) ΔAPS ≅ ΔBQR. Give reason and also mention the criteria of congruence

(4 marks)

1 (b) If ∠ ASP = 45°, what can you say about RQ and BQ. Give reason to support your answer.

(2 marks)

(Total marks 6)

Mark scheme

1 Show that (a) ΔAPS ≅ ΔBQR. Give reason and also mention the criteria of congruence	
Answer	Guidance
AP=BQ(Given) PR=QS(Given) Adding RS to both sides PR+RS=QS+RS PS=QS ∠APS = ∠BQR = 90 ΔAPS ≅ ΔBQR(RHS Criteria)	MI For reason M1 For reason M1 For Reason A1 For correct Criteria
(b) If ∠ ASP = 45°, what can you say about RQ and BQ. Give reason to support your answer.	

Answer	Guidance
If ∠ ASP = 45° Then ∠ BRQ = 45° (As ΔAPS ≅ ΔBQR by CPCT ∠ASP=∠ BRQ) So In ΔBQR ∠ BRQ+∠ BQR +∠ QBR = 180(Angle sum property of triangle) 45° +90° + ∠ QBR =180 So ∠ QBR = 180-90-45 ∠ QBR =45 Since it is an isosceles right angled triangle So RQ=BQ(Angles opposite equal sides are equal)	M1 for finding ∠ QBR=∠ BRQ A1 Correct reason Note: It is not necessary to write all steps

Maths9LK3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK3

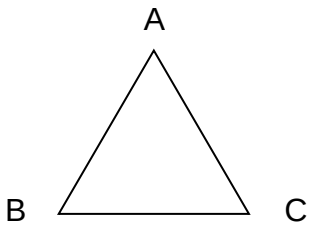
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK3	1		N	9G3e Be able to prove, and to use the fact that: The angles opposite to equal sides of a triangle are equal.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the student to find the vertex angle of a isosceles triangle.

Source(s)



Question(s)

1 In the above triangle, ABC is an isosceles triangle with AB = AC. If the vertex angle is twice the sum of the base angles, then find the vertex angle of the triangle.

A. 30^0
B. 120^0
C. 60^0
D. none of these

(1 mark)

(Total marks 1)

Mark scheme

1 In the above triangle, ABC is an isosceles triangle with AB = AC. If the vertex angle is twice the sum of the base angles, then find the vertex angle of the triangle. A. 30^0 B. 120^0 C. 60^0 D. none of these (1 mark)	
Answer	Guidance
B. 120^0 Let each base angle of an isosceles triangle be x^0. Then vertex angle = $2(x^0 + x^0) = 4\ x^0$ Then by angle sum property of a triangle $x^0 + x^0 + 4x^0 = 180^0$ $6\ x^0 = 180^0$ and $x^0 = 30^0$ and $4x^0 = 120^0$	A1 – to write correct answer

Maths9BS4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9BS4

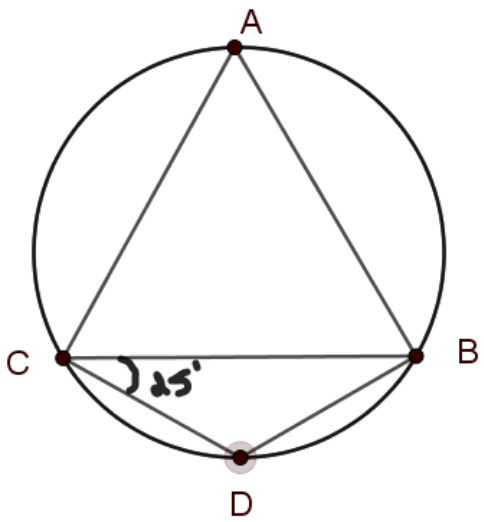
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9BS4		1	N	9G3e Be able to prove, and to use the fact that: The angles opposite to equal sides of a triangle are equal. 9G6h Be able to use the fact that: The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of circles and its properties

Sources and diagrams



Not to scale

Question

1 In the given circle , if BD = DC, and ĐBCD= 25° , then what is ĐBAC ?

A. 25°
B. 50°
C. 80 °
D. 100°

(1 mark)

(Total marks 1)

Mark scheme

1 In the given circle , if BD = DC, and ∠BCD= 25° , then what is ∠BAC	
Answer	Guidance
B. 50°	A1 For correct answer

Maths9IM5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM5	1	1	N	9G3e Be able to prove, and to use the fact that the angles opposite to equal sides of a triangle are equal	2

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use the fact that the angles opposite to equal sides of a triangle are equal

Sources and diagrams

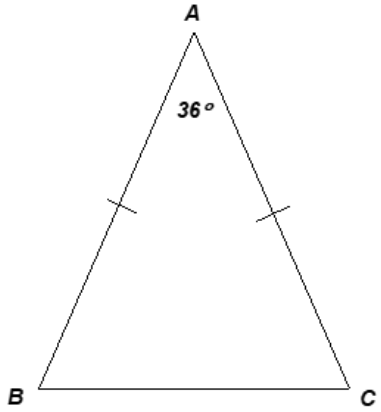


Diagram not to scale

Question

1 ΔABC is an isosceles triangle in which AB = AC. If $\angle A = 36^o$.

Find the measure of $\angle C$.

(2 marks)

(Total marks 2)

Mark scheme

1 ΔABC is an isosceles triangle in which AB = AC. If $\angle A = 36^o$, find the measure of $\angle C$.	
Answer	Guidance
Solution: $\angle A + \angle B + \angle C = 180^o$ $\angle B + \angle C = 180^o - 36^o$ $= 144^o$ (1) Since $\angle B = \angle C$ $\angle C = \frac{144^o}{2} = 72^o$ (1)	M1 for correct sum of $\angle B + \angle C$ Accept 144, 144 degrees A1 for the measure of $\angle C$ Accept 72, 72 degrees

Maths9DP4

This assessment item is designed to assess the end of class assessments for CBSE schools.

*C = Calculator required, N = Calculator not allowed, E = Either

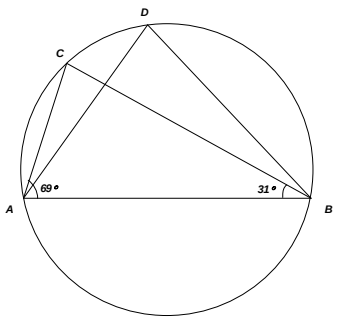
Item purpose

Subject	Class	Question reference/Filename
Maths	9	Maths9DP4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP4	1		E	9G6f Be able to use the fact that: Angles in the same segment of a circle are equal.	1

This question assesses the ability of the student to use the fact that: Sum of the angles of a triangle is 180 degree and angles in the same segment of a circle are equal.

Sources and diagrams



Not to scale

Question

1 In the figure given above, if angle CAB = 69°, and angle CBA = 31°, find the value of angle ADB.

A. 60^0
B. 75^0
C. 80^0
D. 90^0

(1 mark)

(Total marks 1)

Mark scheme

1 In the figure given above, if angle ABC = 69°, and angle ACB = 31° then, find the value of angle BDC. A. 60^0 B. 75^0 C. 80^0 D. 90^0	
Answer	Guidance
80^0	A1 for correct answer only

Maths9IM7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM7

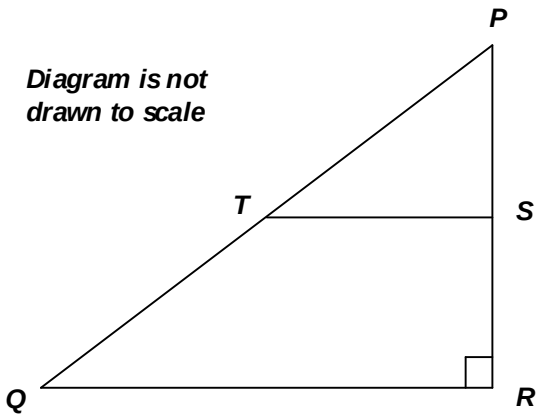
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM7		3	E	9G4f Use the fact that in a triangle, the line segment joining the mid points of any two sides is parallel to the third side and is half of it and (motivate) its converse.	3

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of usage of the converse of midpoint theorem

Sources and diagrams



Note: The triangle PQR is a right – angled triangle. TS and QR are parallel lines.

Question

1 In the given right ΔPQR, T is the midpoint of PQ and TS ∥ QR. QR=16 cm, RP=12 cm.

Find the area of ΔPST.

(3 marks)

(Total marks 3)

Mark scheme

1 In the given right ΔPQR, T is the midpoint of PQ and TS ‖ QR. QR = 16 cm, RP = 12 cm. Find the area of ΔPST.	
Answer	Guidance
$PS = \frac{PR}{2} = 6\ cm$ (1) $TS = \frac{QR}{2} = 8\ cm$ (1) Area ΔPTS = $(\frac{1}{2} \times 6 \times 8) cm^2$ $= 24 cm^2$ (1)	M1 for correct value of PS M2 for correct value of TS A1 for Area ΔPTS = 24 cm^2 Accept 24, 24 sq cm

Maths9LK2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK2

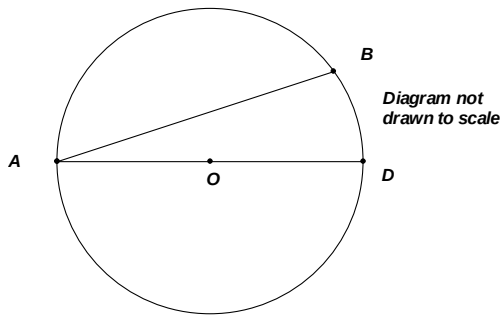
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK2	1		C	9G6b Be able to use the fact that: The perpendicular from the centre of a circle to a chord bisects the chord and conversely, the line drawn through the centre of a circle to bisect a chord is perpendicular to the chord.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the student to find the distance of the chord from the centre.

Source(s)



Question(s)

1 If AD= 8.2 cm and AB = 8 cm then find the distance of AB from the centre.

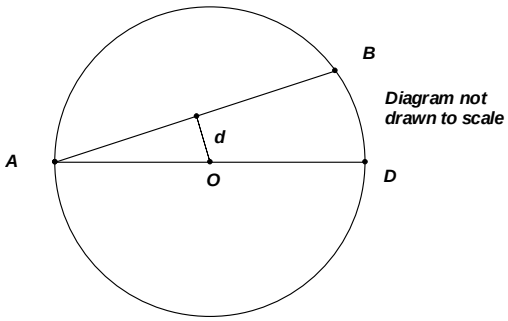
A. 9 cm
B. 0.09 cm

C. 0.009 cm
D. 0.9 cm

(1 mark)

(Total marks 1)

Mark scheme

1 If AD= 8.2 cm and AB = 8 cm then find the distance of AB from the centre. A. 9 cm B. 0.09 cm C. 0.009 cm D. 0.9 cm (1 mark)	
Answer	Guidance
D. 0.9 cm $d^2 + 4^2 = 4.1^2$ $d = \sqrt{0.81} = 0.9$ 	A1 – to write correct answer

Maths9NM1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM1

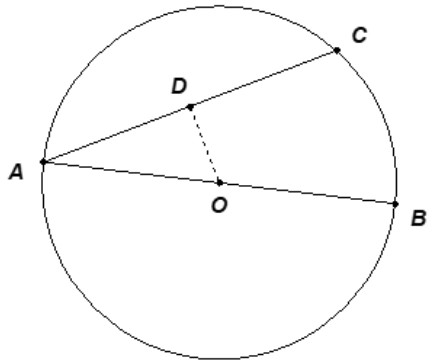
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM1		1	C	9G6b Be able to use the fact that perpendicular from the centre of a circle to a chord bisects the chord.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the properties involving the method of finding distance of a chord from centre of the circle.

Sources and diagrams



Question

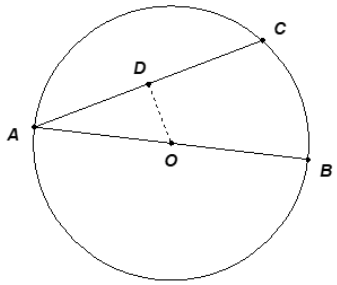
1 In the figure given above, AB is a diameter of a circle and AC is a chord.
If AB=34 cm, AC=30 cm, the distance of AC from the centre of the circle is:

A. 17 cm
B. 15cm
C. 4cm
D. 8cm

(1 mark)

(Total marks 1)

Mark scheme

1 In the figure given above, AB is a diameter of a circle and AC is a chord. If AB=34 cm, AC=30 cm, the distance of AC from the centre of the circle is: A. 17 cm B. 15cm C. 4cm D. 8cm	
Answer	Guidance
 D. 8cm (1) Draw OD⊥ AC (Perpendicular from the centre bisects the chord) AD=15 cm, AO=17 cm OD=$\sqrt{17^2 - 15^2} = 8\ cm$	A1 – 1 mark for correct answer

Maths9BS8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9BS8

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9BS8a	1	2	E	9G6b Be able to use the fact that: The perpendicular from the centre of a circle to a chord bisects the chord and conversely, the line drawn through the centre of a circle to bisect a chord is perpendicular to the chord	3
Maths9BS8b		4	C	9G6b Be able to use the fact that: The perpendicular from the centre of a circle to a chord bisects the chord and conversely, the line drawn through the centre of a circle to bisect a chord is perpendicular to the chord 9A2a Identify the solutions of a linear equation in two variables (*x, y*) as a straight line, including where *x* or *y* is a constant i.e. the equation has only one variable.	4
Total marks	**1**	**6**			**7**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of the properties of circles.

Sources and diagrams

Diagram 1 (a)

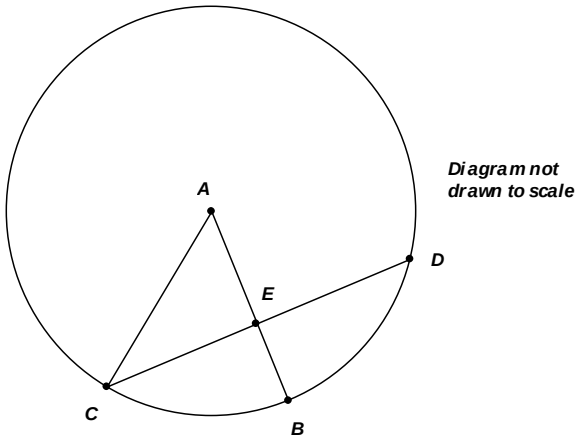
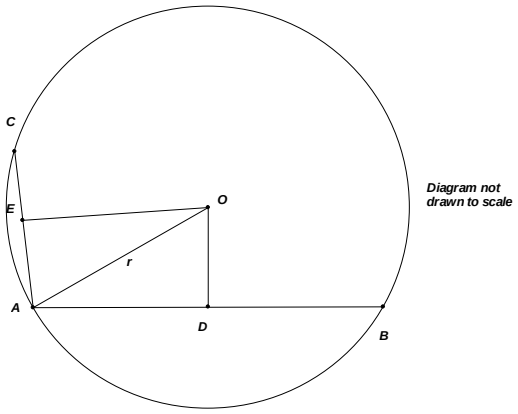


Diagram 1 (b)



Question(s)

1

1 (a) In the Figure 1(a), if AC = 5 cm, CD = 8 cm and AB is perpendicular to CD, then find the length BE

(3 marks)

1 (b) In the Figure 1(b) AB and AC are two chords of a circle of radius r such that AB = 2AC.
If the distances of AB and AC from the centre are 3cm and 6cm respectively, find the radius r up to 3 decimal places

(4 marks)

(Total marks 7)

Mark scheme

<table>
<tr><td colspan="3">1(a) In the Figure 1(a), if AC = 5 cm, CD = 8 cm and AB is perpendicular to CD, then find BE</td></tr>
<tr><td colspan="2">Answer</td><td>Guidance</td></tr>
<tr><td>BE= 2cm</td><td colspan="2">M1 Perpendicular drawn from centre of a circle to the chord bisects the chord, CE= CD/2= 4cm

M1: In ΔACE use Pythagoras Theorem,
AC= 5cm,CE= 4cm, we get

$AC^2 = CE^2 + AE2$

AE = 3cm

A1: BE= AB-AE
= 5cm – 3cm
BE= 2cm</td></tr>
<tr><td colspan="3">1(b) AB and AC are two chords of a circle of radius r such that AB = 2AC. If the distances of AB
and AC from the centre, are 3cm and 6cm respectively. Find the radius r
(Find value up to 3 places of decimal)</td></tr>
<tr><td colspan="2">Answer</td><td>Guidance</td></tr>
<tr><td colspan="2">Radius= 6.708cm</td><td>M1:
Perpendicular drawn from centre of a
circle to the chord , bisects the chord.

In ΔOAE, OA =r, AC =x and AB= 2 x

Perpendicular drawn from centre of a circle to the chord ,bisects the chord

M1: In ΔOAE
$r^2 = (x/2)^2 + 6^2$</td></tr>
</table>

	In ΔOAD $r^2 = (x)^2 + 3^2$ M1: Solving we get $3r^2 = 135$ $r = \sqrt{45}$ A1 : r = 6.708 cm

Maths9LK7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK7

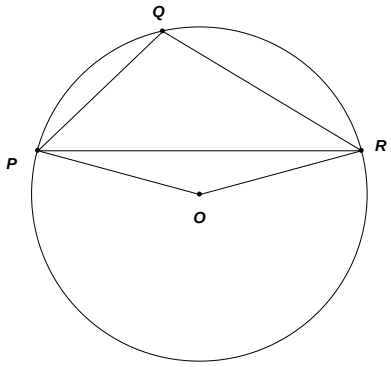
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK7a		2	N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	2
Maths9LK7b	1		N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	1
Total marks	**1**	**2**			**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use the theorem angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.
Sources and diagrams

Source(s)



Question(s)

1 In the given figure $\angle PQR = 100^0$

1 (a) Find the measure of $\angle POR$

(2 marks)

1 (b) Find the measure of $\angle OPR$

(1 mark)

(Total marks 3)

Mark scheme

1 (a) Find the measure of $\angle POR$	
Answer	Guidance
$\angle POR = 100^0$ Here reflex $\angle POR = 2\angle PQR = 2x\ 100^0 = 200^0$ (since angle subtended by an arc at the centre is double the angle subtended by it	M1 to find the reflex $\angle POR$

at any point on the remaining part of the circle) Therefore, $\angle POR = 360^0 - 200^0 = 160^0$	A1 to find the correct value of $\angle POR$ in degree.
1 (b) Find the measure of $\angle OPR$	
Answer 10^0	Guidance
$\angle OPR = 30^0$ In ΔOPR, OP = OR (radii of the same circle) Therefore , $\angle OPR = \angle ORP$-------(i) In ΔOPR, $\angle OPR + \angle ORP + \angle POR = 180^0$ From (i) $\angle OPR + \angle OPR = 180^0 - 160^0$ $2\angle OPR = 20^0$ $\angle OPR = 10^0$	A1 to write correct value of $\angle OPR$.

Maths9LK8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK8

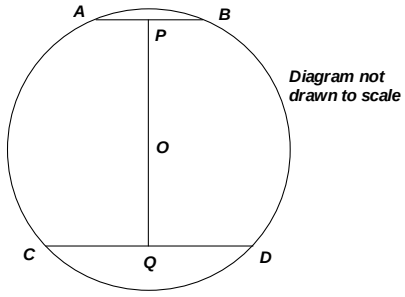
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK8		3	N	9G6b Be able to use the fact that: The perpendicular from the centre of a circle to a chord bisects the chord and conversely, the line drawn through the centre of a circle to bisect a chord is perpendicular to the chord	3

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use the perpendicular from the centre of a circle to a chord bisects the chord.

Source(s)



Question(s)

1 If the radius of a circle is 5 cm, AB = 6 cm and CD = 8 cm then determine PQ

(3 marks)

(Total marks 3)

Mark scheme

1 In the diagram, PQ is perpendicular to both AB and CD, and goes through the centre of the circle, O. If the radius of a circle is 5 cm, AB = 6 cm and CD = 8 cm then determine PQ.	
Answer	Guidance
PQ = 7 cm Since, the perpendicular from the centre of a circle to a chord bisects the chord. Therefore, P and Q are mid points of AB and CD respectively. AP = PB = 1/2 AB = 3 cm and CQ =QD = ½ CD =4 cm In right ∆OAP and OCQ by using Pythagoras theorem $OA^2 = OP^2 + AP^2$ and $OC^2 = OQ^2 + CQ^2$ $OP^2 = 5^2 - 3^2$ $OQ^2 = 5^2 - 4^2$ $OP^2 = 16$ $= 9$ $\Rightarrow OP = 4$ and $OQ = 3$ PQ = OP + OQ = (4+3) = 7 cm	M1 to use the perpendicular from the centre of a circle to a chord bisects the chord M1 to find the correct value of OP and OQ by Pythagoras theorem A1 to find correct value of PQ.

Maths9LK9

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK9

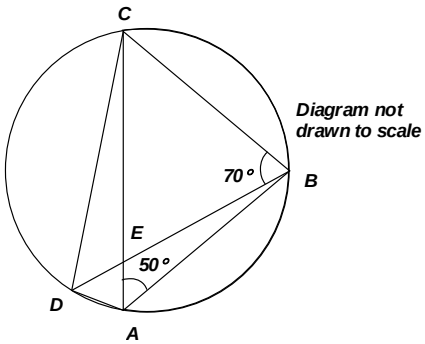
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK9a		2	N	9G6h Be able to use the fact that: The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.	2
Maths9LK9b	1		N	9G6h Be able to use the fact that: The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.	1
Total marks	**1**	**2**			**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use the fact that the sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180°.

Source(s)



Question(s)

1 In the given figure $\angle DBC = 70^0$ and $\angle BAC = 50^0$.

1 (a) Find the measure of $\angle BCD$

(2 marks)

1 (b) If AB = BC, then find the measure of $\angle ECD$

(1 mark)

(Total marks 3)

Mark scheme

1 (a) Find the measure of $\angle BCD$	
Answer	Guidance
$\angle BCD = 60^0$ Given $\angle DBC = 70^0$ and $\angle BAC = 50^0$ $\angle CBD$ and $\angle CAD$ are angles on the same segment CD Therefore $\angle CBD = \angle CAD$ $\angle CAD = 70^0$ Now $\angle BAD = \angle BAC + \angle CAD$ $\Rightarrow \angle BAD = 50^0 + 70^0 = 120^0$ Since ABCD is a cyclic quadrilateral. $\angle BAD + \angle BCD = 180^0$ $120^0 + \angle BCD = 180^0$ $\angle BCD = 60^0$	M1 to use the properties of circle that is angles on same segment are equal and opposite angles of a cyclic quadrilateral is supplementary. A1 to find the correct value of $\angle BCD$.

1 (b) If AB = BC, then find the measure of $\angle ECD$	
Answer	Guidance
If AB = AC, then in ΔABC, we have $\angle ACB = \angle BAC$ $\Rightarrow \angle ACB = 50^0$ Therefore $\angle ECD = \angle BCD - \angle ACB$ $= 60^0 - 50^0 = 10^0$	A1 to write correct value of $\angle ECD$.

Maths9LK10

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK10

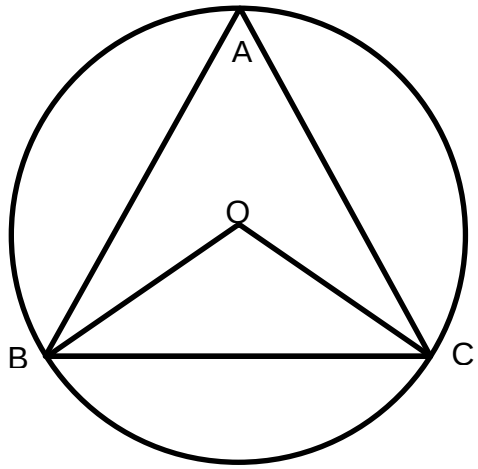
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK10a	1		N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	1
Maths9LK10b	1		N	9G6e Be able to prove, and use the fact that: he angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	1
Maths9LK10c	1		N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	1
Maths9LK10c	1		N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	1
Total marks	**4**				**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to use angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.

Source(s)



Question(s)

1 Three STD booth are placed at A, B and C in the figure and these are operated by handicapped persons. These three booth are equidistant from each other as shown in the figure

1 (a) Find the measure of ∠BAC

(1 mark)

1 (b) Find the measure of ∠BOC

(1 mark)

1 (c) Find the sum of ∠OBC and ∠OCB

(1 mark)

1 (d) If AB = 8 cm, find the value of (BC+ CA)

(1 mark)

(Total marks 4)

Mark scheme

1 (a) Find the measure of ∠BAC	
Answer	Guidance
∠BAC = 60^0 Since ∆ABC is an equilateral triangle.	A1 to find the correct value of∠BAC.
1 (b) Find the measure of ∠BOC	
Answer	Guidance
∠BOC= 120^0 Since the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.	A1 to write correct value of ∠BOC.
1 (c) Find the sum of ∠OBC and ∠OCB	
Answer	Guidance
60^0 ∠BOC + ∠OCB = 30^0+30^0 = 60^0 ∆BOC is an isosceles triangle.	A1 to write correct value of ∠OBC+∠OCB.
1 (d) If AB = 8 cm, find the value of (BC+ CA	
Answer	Guidance
16 cm ∆ ABC is an equilateral triangle. Therefore BC +CA = 16 cm	A1 to write correct value of BC +CA.

Maths9CN7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN7

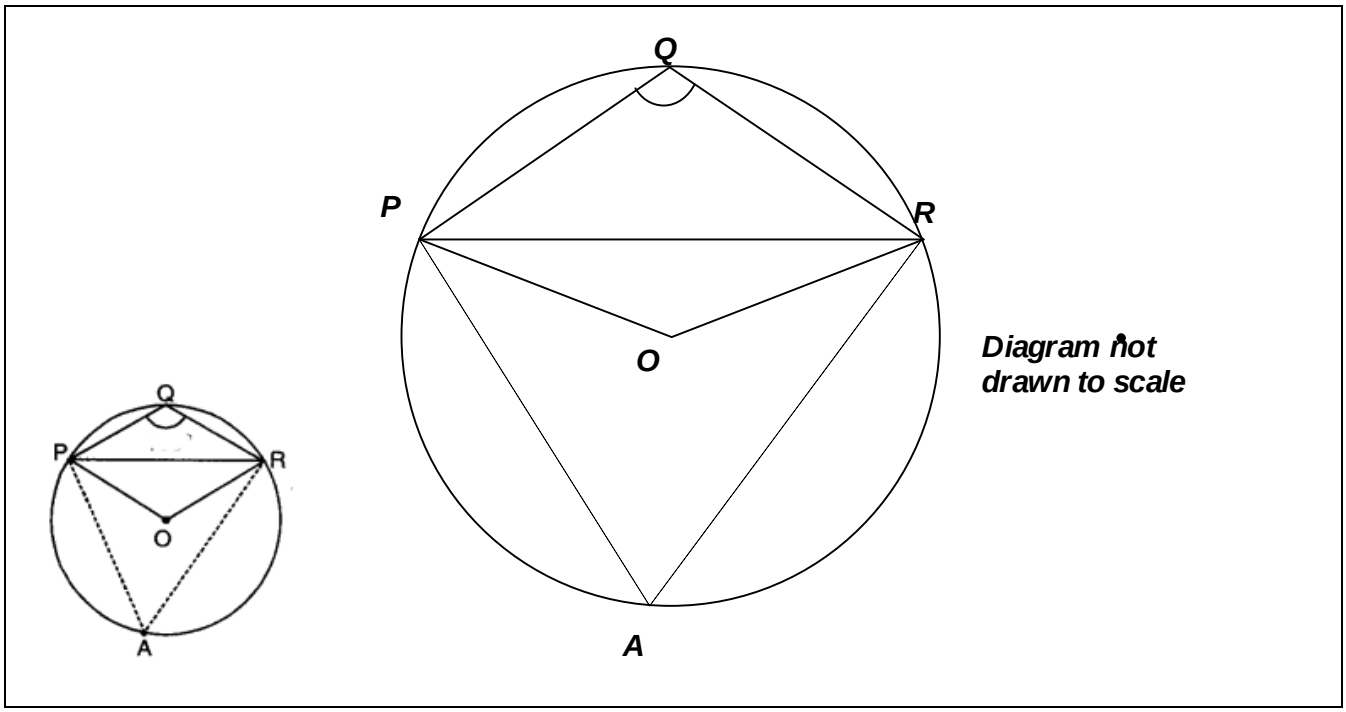
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9CN7a	2		N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle	2
Maths9CN7b		2	N	9G6e Be able to prove, and use the fact that: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle	2
Maths9CN7c		2	N	9G3e Be able to prove, and to use the fact that: The angles opposite to equal sides of a triangle are equal.	2
Total marks	**2**	**4**			**6**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to calculate angle subtended by an arc at the centre and the angle subtended by an arc at any point on the remaining part of the circle

Sources and diagrams



Question(s)

1 Four friends Rima, Sita, Mohan and Sohan are sitting on the circumference of a circular park. Their locations are marked by points A, P, Q and R.

Rohit joins them and sits at the centre of the circular park, so he is equidistant from all the other friends. His position is marked as O.

They are sitting in such a way that ∠PQR = 110°.

1 (a) What is the measure of reflex of ∠ POR. Give reason

(2 marks)

1 (b) What is the measure of ∠PAR? Give reason

(2 marks)

1 (c) Find ∠ OPR. Give reason (2 marks)

(Total marks 6)

Mark scheme

1(a) What is the measure of reflex of ∠POR. Give reason	
Answer	Guidance
Reflex ∠POR = 220° (Angle subtended by an arc at the centre is double the angle subtended by it in the remaining part of the circle)	M1 reason A1 Correct answer
1(b) What is the measure of ∠ PAR? Give reason	
Answer	Guidance
Reflex $\angle POR$ = 220° SO ∠POR = 140° Hence $\angle PAR$ = 70° (Angle subtended by an arc at the centre is double the angle subtended by it in the remaining part of the circle) *Alternative: use PQR = 110 (given) and opposite angles in cyclic quadrilateral add to 180.*	MI Reason A1 Correct answer
1(c) Find ∠OPR. Give reason	
Answer	Guidance
OP=OR(Radius_ ∠OPR+∠POR +∠ORP =180°(Sum of angles of a triangle) OP=OR So ∠OPR =∠ORP(angles opposite equal sides are equal) So 2∠OPR+∠POR = 180° 2∠OPR =180-140 =40° ∠OPR =20°	M1 reason A1 Correct answer

Maths9CN8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN8

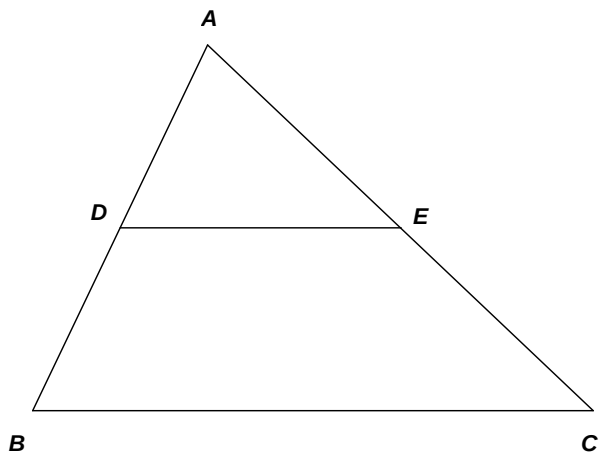
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9CN8	2	3	N	9G4f Use the fact that: In a triangle, the line segment joining the mid points of any two sides is parallel to the third side and in half of it and (motivate) its converse. 9G4d Use the fact that: A quadrilateral is a parallelogram if a pair of its opposite sides is parallel and equal.	5

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to calculate sides of triangles

Sources and diagrams



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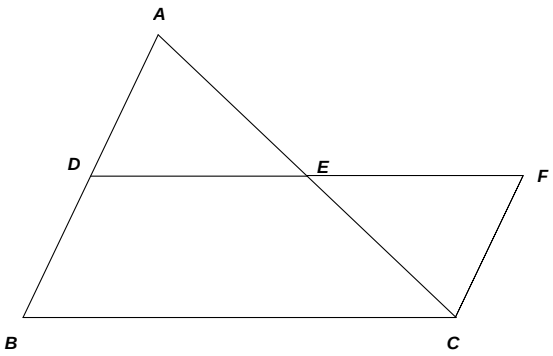
Question

1 Prove that **the line segment joining the mid-points of two sides of a triangle is parallel to the third side of the triangle**

(5 marks)

(Total marks 5)

Mark scheme

1 Prove that **the line segment joining the mid-points of two sides of a triangle is parallel to the third side of the triangle**	
Answer	Guidance
 Construction : Extend the line segment joining points D and E to F such that DE = EF and join CF. Proof: In ΔAED and ΔCEF DE = EF (Given) $\angle AED$ = ∠ CEF(Vertically opposite angles) AE = CE(E is the midpoint of AC) ΔAED ≅ ΔCEF(SAS) AD=CF(CPCT) $\angle DAE = \angle FCE$ $(CPCT)$	M1 Construction M1 For reason

Since alternate interior angles are equal so AB ‖ CF AD=BD(D is mid point) BD=CF BD ‖ CF So BDFC is a parallelogram As one pair of side is parallels and equal So DF ‖ BC i.e DE ‖ BC	M1 For congruence criteria M1 For reason A1 for proving parallelgram

Maths9CN9

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN9

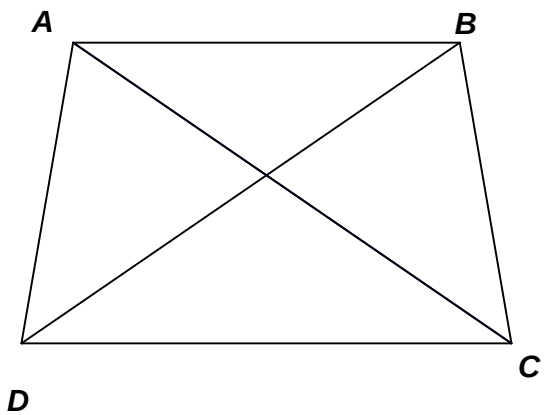
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9CN9a	2		E	9G6h Be able to use the fact that: The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.	2
Maths9CN9b		3	E	9G6f Be able to use the fact that: Angles in the same segment of a circle are equal.	3
Total marks	**2**	**3**			**5**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability that if The sum of either of the pairs of the opposite angles of a quadrilateral is 180° then it is cyclic.

Sources and diagrams



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Question(s)

1 (a) In quadrilateral ABCD, the sum of angles ABC and ADC is 180°.

Is ABCD a cyclic quadrilateral?

Give reason to justify your answer (2 marks)

1 (b) If ∠ DBC = 55° and ∠ BAC =45 ° Find ∠ BCD.

(3 marks)

(Total marks 5)

Mark scheme

1 (a) In quadrilateral ABCD, the sum of angles ABC and ADC is 180°. Is ABCD a cyclic quadrilateral? Give reason to justify your answer	
Answer	Guidance
If the sum of opposite angles of a quadrilateral is 180 then the quadrilateral is cyclic. Yes vertices of the quadrilateral lie on the circle	M1 for reason A1 for correct answer
1(b) If ∠ DBC = 55° and ∠ BAC =45 ° Find ∠ BCD.	
Answer	Guidance
∠ DBC = 55° ∠ DAC = 55°(Angles in the same segment of the circle) ∠ BAC =45 ° ∠ DAB = ∠ DAC + ∠ BAC =45 ° + 55° = 100 ∠ BCD +∠ DAB = 180(Opposite angles of a cyclic quadrilateral) ∠ BCD = 180-100 = 80	M1 for reason M1 for reasonA1 for correct answer Alternate method: ∠ BDC = ∠BAC=45(Angles in the same segment of the circle) In Δ BDC ∠ BDC+∠ DBC + ∠ BCD = 180(Angle sum property of triangle) ∠ BCD = 180 -45-55=80

Maths9MS8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9MS8

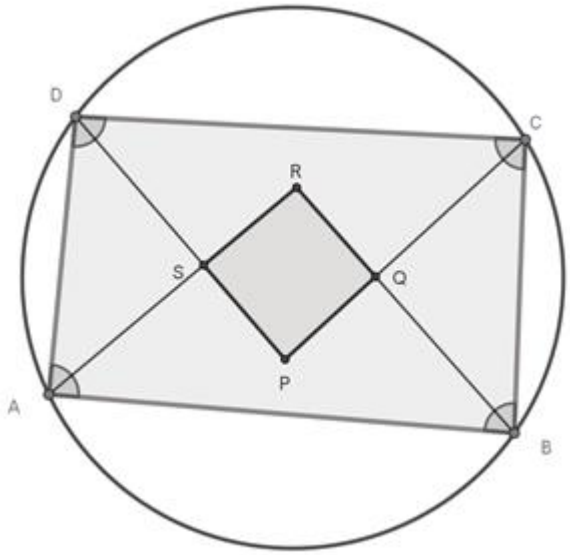
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9MS8a	2		N	9G6h Be able to use the fact that: The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse	2
Maths9MS8b		5	N	9G6h Be able to use the fact that: The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse	5
Total marks	**2**	**5**			**7**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge about properties of cyclic quadrilateral

Sources and diagrams



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Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 ABCD is a cyclic quadrilateral. PQRS is a quadrilateral formed by the internal angle bisectors of the angles of ABCD.

1 (a) If ∠A = 90°, ∠B = x°, ∠C = y°, ∠D = 110°, Evaluate $x + y$

(2 marks)

1 (b) Prove that the quadrilateral PQRS is also cyclic.

(5 marks)

(Total marks 7)

Mark scheme

1 (a) If ∠A = 90°, ∠B = x°, ∠C = y°, ∠D = 110°, Evaluate $x + y$	
Answer	Guidance
180°	M1: Getting the value of x and y M2 : Getting the value of $x + y$ A1: Value of x = 70° and y = 90° - 1 mark A2: Value of x+y = 160° - 1 Mark

1 (b) Prove that the quadrilateral PQRS is also cyclic.	
Answer	Guidance
Proving the sum of opposite angles = 180°	M1: Identifying the angle measures of quadrilateral PQRS M1:Proving the sum of opposite angles of quadrilateral = 180° A1: Identifying the angle measures of angles in quadrilateral PQRS – 3 marks A2: Proving Sum of opposite angles of quadrilateral PQRS= 180° -2 marks

Maths9AN1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN1

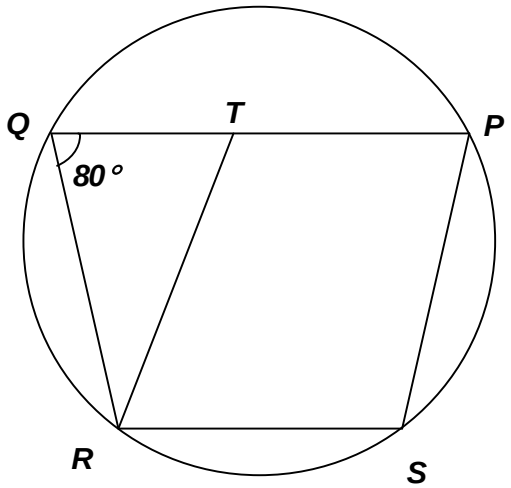
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN1		1	E	9G6h (Be able to use the fact that: The sum of either of the pair of the opposite angles of a cyclic quadrilateral is 180° and its converse.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to identify and use properties of cyclic quadrilaterals.

Sources and diagrams



(Figure not to scale)

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 In the figure below, P, Q, R and S are points on the circle and T is a point inside the circle on PQ. ∠PQR = 80°. Which of the following is definitely true?

(i) ∠PTR = 80°
(ii) ∠PSR = 100°

A. only (i)
B. only (ii)
C. both (i) and (ii)
D. neither (i) nor (ii)

(1 mark)

(Total marks 1)

Mark scheme

1 In the figure below, P, Q, R and S are points on the circle and T is a point inside the circle. ∠PQR = 80°. Which of the following is definitely true? (iii) ∠PTR = 80° (iv) ∠PSR = 100° A. only (i) B. only (ii) C. both (i) and (ii) D. neither (i) nor (ii)	
Answer	Guidance
B. only (ii) Opposite angles add to 180, but T can be anywhere on PQ, inside the circle, so PTR will be greater than 80.	A1: Correct answer only Do not penalize the student if he writes (ii) only or B.

Maths9RS3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS3

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS3	2		E	9M1a Calculate the area of a triangle using Heron's formula	2

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses basic to find area of triangle using Heron's formula.

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question(s)

1 If in a triangle (s - a), (s - b) and (s - c) are 150 m, 100 m and 20 m respectively, then find the sides a, b and c of the triangle, where s is the semi perimeter of the triangle

(2 marks)

(Total marks 2)

Mark scheme

1 If in a triangle (s- a), (s- b) and (s -c) is 150 m, 100 m and 20 m then find the sides a, b and c of the triangle, where s is the semi perimeter of the triangle.	
Answer	Guidance
According to the question	M1 To get till equation (i)

s- a = 150 m s-b = 100 m s- c = 20 m we know $s = \frac{a+b+c}{2}$ or a+b+c = 2s…….(i) s-a+s-b +s-c = 150+100+20 3s –(a+b+c) = 270 Or 3s – 2s = 270 (from eq 1) S = 270 Now s -a = 150 270- a = 150 Or a = 120 m Similarly b = 170 m And c = 250 m	A1 getting correct answer of a, b and c

Maths9AN9

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN9

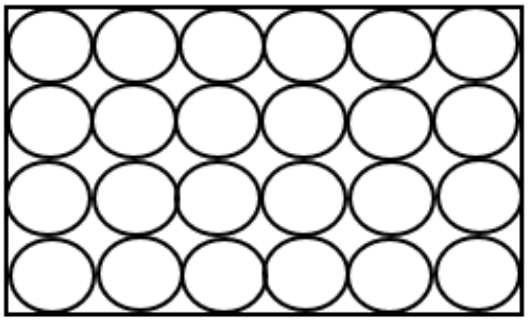
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN9a	1	1	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	2
Maths9AN9b		2	C	9M1a Calculate the area of a triangle using Heron's formula (without proof) and its application in finding the area of a quadrilateral.	2
Maths9AN9c	2	1	C	8M4a Find the surface area of cuboids and cylinders	3
Total marks	**3**	**4**			**7**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses student's ability to apply formulae of Surface area and volumes to solve real word problems.

Sources and diagrams



Not to scale

Figure 1: Chocolate box

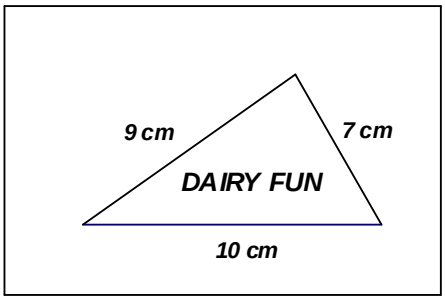


Diagram not drawn to scale

Figure 2: Lid of the box

Figures not to scale

Question(s)

1 Twenty-four spherical shaped chocolates are arranged in an open cuboidal box in four rows and six columns. Each chocolate has a radius of 1.2 cm. The 24 chocolates fit perfectly in the box with each chocolate touching the ones around it or the sides of the box.

1 (a) Calculate the volume of 24 chocolates inside the box.

(2 marks)

1 (b) The lid of the box (Figure 2) has a triangular design as shown in figure above. The triangle has sides 10 cm, 9 cm and 7 cm. Find the area of the triangular design.

(2 marks)

1 (c) Calculate the outer Surface area of the open box in Figure 1 correct to two decimal places.

(3 marks)

(Total marks 7)

Mark scheme

1 (a) Calculate the volume of 24 chocolates inside the box.	
Answer	Guidance
1 (a) 173.717 cm^3 Volume of sphere = $\frac{4}{3}\pi\, r^3$ Volume of 24 chocolates = $24 \times \frac{4}{3}\pi\ (1.2)^3$ = 173.717 cm^3	M1: using formula for sphere A1: to find correct answer
1 (b) The lid of the box (Figure 2) has a triangular design as shown in figure above. The triangle has sides 10 cm, 9 cm and 7 cm. Find the area of the triangular design.	
Answer	Guidance
30.6 cm^2 a = 10 cm b= 9 cm c = 7 cm s = $\frac{a+b+c}{2}$ = $\frac{10+9+7}{2}$ = 13 cm Area of design = $\sqrt{s(s-a)(s-b)(s-c)}$ = $\sqrt{13(13-10)(13-9)(13-7)}$ = $\sqrt{13 \times 3 \times 4 \times 6}$ = $\sqrt{936}$ = 30.59cm^2 (accept 30.6)	M1: finding correct semi-perimeter A1: Finding correct area using Heron's Formula

	Do not penalize the student for omitting units.
1 (c) Calculate the outer Surface area of the open box in Figure 1 correct to two decimal places.	
Answer	Guidance
1 (c) 253.44 cm^2 Diameter of 1 chocolate = 1.2 × 2 = 2.4 cm Length of the box (l) = 2.4 × 6 = 14.4 cm Breadth of the box (b) = 2.4 × 4 = 9.6 cm Height of the box (h) = 2.4 cm Surface area of open box = Area of side faces + base = 2h (l + b) + l × b = 2 × 2.4 × (14.4 + 9.6) + 14.4 × 9.6 = 2 × 2.4× 24 + 138.24 = 115.2 + 138.24 = 253.44 cm^2 (accept 253.4 or 253) Alternatively, Students can calculate the Surface area of open box = TSA- area of the top face = 2(l×b + b×h + h×l) - l × b = 2 (14.4× 9.6 + 9.6 × 2.4 + 2.4 × 14.4) - 14.4 × 9.6 = 2(138.24 + 23.04 + 34.56) – 138.24 = 391.68 – 138.24 = 253.44 cm^2	M1: to calculate the correct values of length, breadth and height of the cuboidal box. M1: to correctly use the expression to calculate the area of 5 faces of the box. A1: correct answer Do not penalize the student for omitting units.

Maths9RS5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS5		3	C	9M1a Calculate the area of a triangle using Heron's formula	3

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses basic knowledge of heron's formula.

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question(s)

1 The sides of a triangular park of a school are 120 m, 100m and 110m.

The school principal gave a contract to a company to plant grass in the park at the rate of Rs 4500 per hectare.

How much does the school have to pay to the company? Give your answer to the nearest 100 Rs.

(3 marks)

(Total marks 3)

Mark scheme

1. The dimensions of a triangular park of a school are 120 m, 100m and 110m.

The school principal gave a contract to a company to plant grass in the park at the rate of Rs 4500 per hectare.

How much does the school have to pay to the company? Give your answer to the nearest 100 Rs.

Answer	Guidance
Semi perimeter= $\frac{120+100+110}{2}$= $\frac{330}{2}$= 165 Area of triangle =$\sqrt{165(165-120)(165-100)(165-110)}$ = $\sqrt{165 \times 45 \times 65 \times 55}$ = 825$\sqrt{39}$ = 825 x 6.245 = 5152.12... square metre (1 hectare = 10000 sq m) = 0. 5152 hectare Cost of planting trees = 4500 x 0.5152 = Rs 2318 = Rs 2300 (to nearest 100) Answers which rounded intermediate values may come to something other than 2318, but should round to 2300.	M1 For using correct Heron's formula and putting values A1 area of triangle in hectare A1 Cost of planting trees

Maths9IM6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM6

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM6a	1		C	9M2a - Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders / cones.	1
Maths9IM6b		2	C	9M2a - Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders / cones.	2
Total marks	**1**	**2**			**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of volumes of different right circular cylinders.

Sources and diagrams

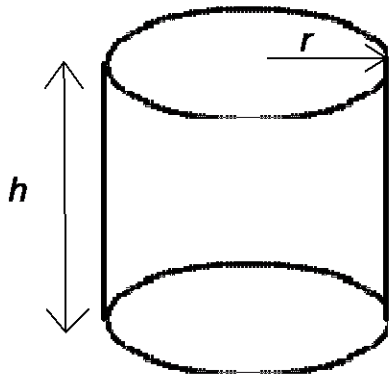


Figure not to scale

Question(s)

1 The cylinder shown in the figure has radius 10 cm and its volume is 6600 cm^3.

1 (a) What is the formula for finding the volume of a cylinder?

(1 mark)

1 (b) Find the height of the cylinder. (Take $\pi = \frac{22}{7}$)

(2 marks)

(Total 3 marks)

Mark scheme

1 (a) What is the formula for finding the volume of a cylinder?	
Answer	Guidance
$V = \pi r^2 h$	A 1 Correct response only
1 (b) Find the height of the cylinder. (Take $\pi = \frac{22}{7}$)	
Answer	Guidance
Radius = 10 cm Volume = 6600 cm^3 $\frac{22 \times 10 \times 10 \times h}{7} = 6600$ $\frac{6600 \times 7}{22 \times 100} = h$ $\frac{46200}{2200} = h$ 21 = h Answer: $h = 21\ cm$	M 1 $h = \frac{46200}{2200}$ or equivalent A 1 $h = 21\ cm$ Accept h = 21

Maths9JJ3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ3

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ3	1		C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of student to use the relationship between diagonal and side of a cube and hence find the volume.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 Find the volume of the cube if its diagonal is $\sqrt{33}$ cm?

A. 3.32 cm^3
B. 3.648 cm^3
C. 11 cm^3
D. 36.48 cm^3

(1 mark)

(Total marks 1)

Mark scheme

1 Find the volume of the cube if its diagonal is √33 cm? A. 3.32 cm^3 B. 3.648 cm^3 C. 11 cm^3 D. 36.48 cm^3	
Answer	Guidance
D. 36.48 cm^3	1 mark for the correct answer

Maths9AN2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN2		1	E	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to calculate the percentage change in the volume of a cube under change in its edge.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 If each edge of a cube is increased by 25%, the percentage increase in its surface area is

A. 25 %
B. 48.75 %
C. 50 %
D. 56.25 %

(1 mark)

(Total marks 1)

Mark scheme

1 If each edge of a cube is increased by 25%, the percentage increase in its surface area is A. 25 % B. 48.75 % C. 50 % D. 56.25 %	
Answer	Guidance
D. 56.25% 1.25^2=1.5625, so 56.25% increase	A1: Correct answer only Do not penalize the student for missing the percentage sign. Please accept answers (D) or 56.25%

Maths9SM5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9SM5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9SM5a	1	1	C	9M2a Calculate the surface areas and volumes of cubes, cuboids.	2
Maths9SM5b	1	1	C	9M2a Calculate the surface areas and volumes of cubes, cuboids.	2
Total marks	**2**	**2**			**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the correct application of formula of a cuboid.

Sources and diagrams

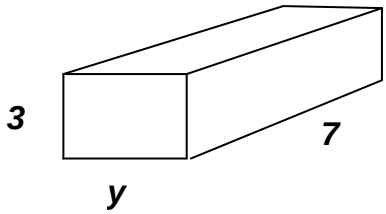


Diagram not drawn to scale

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 Raju went to the market and bought a cuboidal box of volume 105cm^3. The dimensions of box are 7cm x 3cm x y cm, as shown in the diagram.

1 (a) Find y

(2 marks)

1 (b) Raju wants to cover four faces of the box by coloured paper, leaving top and bottom uncovered. How much square cm of paper is required to cover it?

(2 marks)

(Total marks 4)

Mark scheme

1 (a) Find y	
Answer	Guidance
Volume = l x b x h 105 =7 x 3 x y (1) y = 5cm (1)	M1 for equating correct values in the formula A1for calculating correct value of y.
1 (b) Raju wants to cover the four faces of the box (leaving top and bottom) by coloured paper. How much square cm of paper is required to cover it?	
Answer	Guidance
2(l+b) x h=2(7+5) x 3 (1) =72 square cm. (1)	M1 for attempting to take area of 4 sides A1 for correct answer

Maths9DP8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9DP8

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP8a	1	1	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	2
Maths9DP8b	3	1	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	4
Total marks	**4**	**2**			**6**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

This question assesses the ability of the student to understand how to break a problem into component parts and calculate volume and total surface area of a cuboid, and use proportion in a real-world context.

Sources and diagrams

Questions

1 Meera's bedroom has 3 closets. The first closet measures 4 ft. in length, 3 ft. in width and 7 ft. in height. The second closet measures 5ft. length, 2 ft. in width and 7 ft. in height. And the third closet measures 5ft. in length, 5 ft in width and 4 ft in height. (Use 1ft = 30 cm)

1 (a) She wants to keep winter clothes in the closet having maximum space. In which closet should she keep them in ? Show your working.

(2 marks)

1 (b) Calculate the total surface area of all the three closets. Write your answer in meter squares.

(4 marks)

(Total marks 6)

Mark scheme

1 (a) She wants to keep winter clothes in the closet having maximum space. In which closet she should keep?	
Answer	Guidance
In third closet volume of first closet= lxbxh=4x3x7 = 84 volume of second closet= 5x2x7= 70 volume of third closet= 5x5x4 = 100 third closet will have maximum space.	M1 – to find volume of all three closets. A1 for correct answer Don't penalise if unit is omitted.
1 (b) Calculate the total surface area of all the three closets. Write your answer in meter squares.	
Answer	Guidance
TSA of first Closet= 2 (lb+bh+hl) 2 (12+21+28) =122 square ft TSA of second Closet= 2 (lb+bh+hl) 2 (10+14+35) =118 square ft TSA of third Closet= 2 (lb+bh+hl) 2 (25+20+20) =130 square ft TSA of all the three closets= 122+118+130 =370 square ft =370 x $(30/100)^2$ = 33.3 square meters 370 square ft OR 33.3 square metres	M1 to find SA of a cuboid and A3 for calculations being correct (1 each for up to 2 correct and last mark for correct total)

Maths9RS8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS8

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS8a		2	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	2
Maths9RS8b		2	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	2
Maths9RS8c		2	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	2
Total marks		**6**			**6**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of surface area and volume of solid shapes

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question(s)

1 A cylinder vessel of radius 18 cm and height 70 cm is half filled with water. Rohan put a spherical ball in the vessel. By doing this the height of water raised 24 cm. On the basis of this find answer of the following questions:

1 (a) Find the radius of the sphere.

(2 marks)

1 (b) Find the capacity of cylindrical vessel in litres.

(2 marks)

1 (c) If Rohan wanted to paint the sphere with blue colour then find the cost of painting at the rate of Rs 57 per square cm.

(2 marks)

(Total marks 6)

Mark scheme

1 (a) Find the radius of the sphere.	
Answer	Guidance
Let radius of sphere is R cm Volume of sphere = volume of water raised in cylinder $\frac{4}{3}\pi R^3 = \pi r^2 h$ $\frac{4}{3}\pi R^3 = \pi 18^2 \times 24$ $R^3 = 18 \times 18 \times 18$ R = 18 cm.	M1 For equating volume of sphere and volume of cylinder A1 for finding correct radius

1 (b) Find the capacity of cylindrical vessel in litres.	
Answer	Guidance
r = 18 cm , h = 70 cm Capacity of cylindrical vessel = $\pi r^2 h$ $= \frac{22}{7} \times 18^2 \times 70$ $= 22 \times 18 \times 18 \times 10$ = 71,280 cm^3 = 712.8 litre (1 litre = 1000 cubic cm)	M1 For putting correct values in the formula A1 writing final answer in litres Note student can use value of π as 3.14 also, will consider answer in that case also.
1 (c) If Rohan wanted to paint the sphere with blue colour then find the cost of painting at the rate of 5 paise per square cm.	
Answer	Guidance
Surface area of sphere = $4\pi r^2$ $= 4 \times \frac{22}{7} \times 18 \times 18$ $= \frac{28512}{7}$ = 4073.14 sq. cm Cost of painting = 4073.14×5 = 4073.14 x 5 =20365.7 paise = Rs 203.65	M1 for putting correct values in the formula A1 for finding the correct cost of painting.

Maths9AG1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AG1

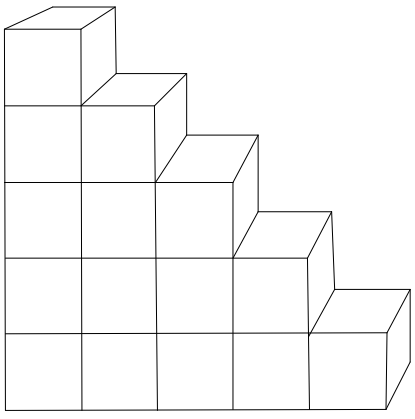
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AG1	1	2	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	3

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the logical thinking of student and their knowledge application.

Sources and diagrams



Not to scale

Question

1 Astha is playing with building blocks which are cube shaped. She builds a structure as shown above. If the edge of a cube is 3 cm, find the volume of the structure built by Astha in $cm^{3.}$

3 marks)

(Total marks 3)

Mark scheme

1 Astha is playing with building blocks which are cube shaped. She builds a structure as shown above. If the edge of a cube is 3 cm, find the volume of the structure built by Astha in $cm^{3.}$	
Answer	Guidance
405 cm^3	M 1 Volume of one cube = $(edge)^3 = 3^3 = 27$ cm^3 M 1 Volume of structure = No. of cubes X Volume of one cube. A 1 Volume = 15 X 27 = 405 cm^3

Maths9AG2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AG2

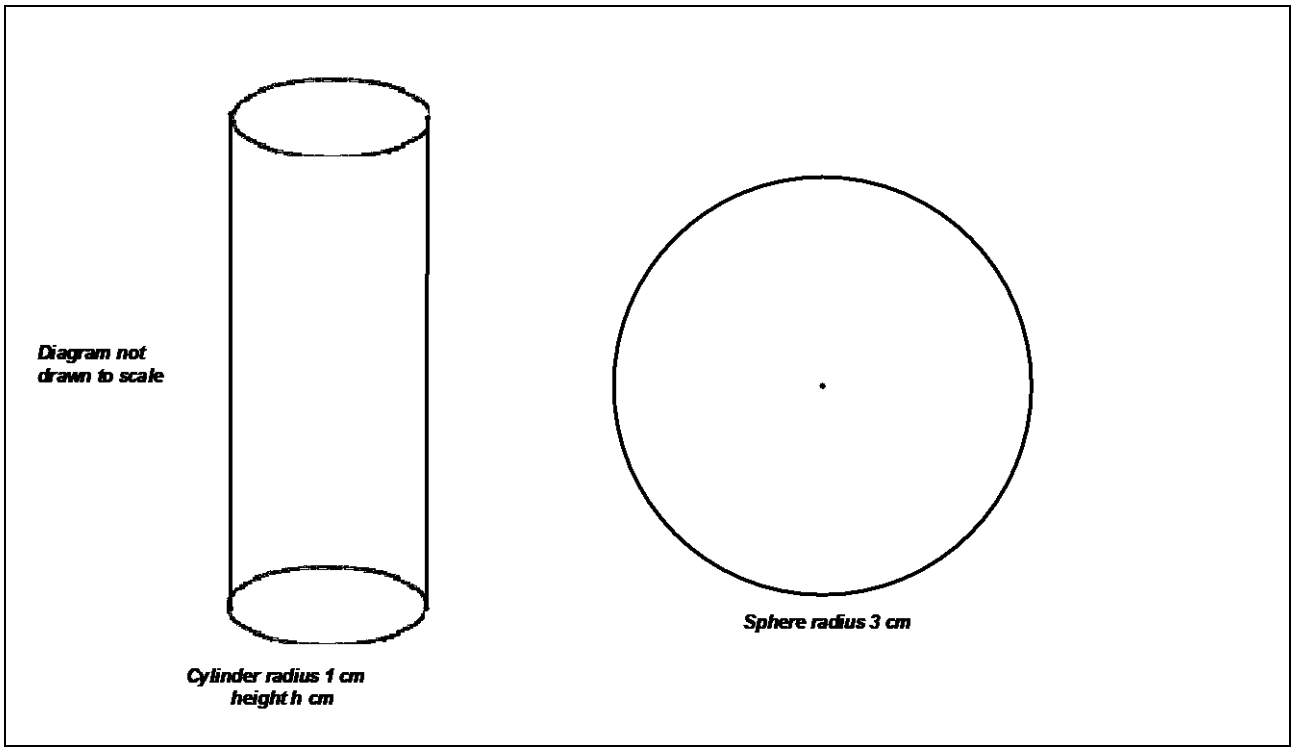
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AG2	2	2	E	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the practical knowledge of student and how he or she able to apply his or her knowledge in different applications of daily life situations.

Sources and diagrams



Source information if copied: book/journal, author, publisher, website link etc.

Question

1 A child playing with clay forms a spherical ball with a radius of 3 cm. After some time he recasts the same spherical ball into a cylindrical pillar with a radius of 1 cm. Find the height of the new formed pillar. (Use π = $\frac{22}{7}$)

(4 marks)

(Total marks 4)

Mark scheme

1 A child playing with clay forms a spherical ball with a radius of 3 cm. After some time he recasts the same spherical ball into a cylindrical pillar with a radius of 1 cm. Find the height of the new formed pillar. (Use π = $\frac{22}{7}$)	
Answer	Guidance
Height = 36 cm	M 1 Volume of Sphere = Volume of Cylinder M 1 Volume of Sphere = $\frac{4}{3}\pi\, r^3$ M 1 Volume of Cylinder = $\pi\, r^2\, h$ A 1 $\frac{4}{3}\, X\, \pi\, X\, 27 = \pi\, X\, 1\, X\, h$ $h = 36\, cm$

Maths9GB7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9GB7

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9GB7	2	2	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to interpret a real-word problem, break given information into smaller components to apply/calculate surface area of a compound shape and apply his/her understanding.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 The diameter of a cylindrical roller is 90 cm and its length is 110 cm long.

If it takes 560 complete revolutions to level a children's playground, find the cost of levelling the playground at the rate of ₹ 500 per square metre.

(Use π = 3.14)

(4 marks)

(Total marks 4)

Mark scheme

1 The diameter of a cylindrical roller is 90 cm and its length is 110 cm long, If it takes 560 complete revolutions to level a children's playground, find the cost of levelling the playground at the rate of ₹ 5 per square metre. (Use π = 3.14)	
Answer	Guidance
₹ 870408 Accept ₹ 870400 or ₹ 870410 or ₹ 870 000	M1 A1 for area levelled in 1 revolution Area = $2\pi rh$ = 2×3.14×45×110 = 31086 cm^2 or 3.1086 m^2 A1 – to find area levelled in 560 revolutions Explanation: Area × 560 revolutions = 17408160 cm^2 or 1740.82 m^2 M1 A1 – to find cost of levelling by using correct conversion of area or cost per sq. m Explanation: Total area×5 per m^2 = 17408160 × $\frac{5}{10000}$ or 1740.82 × 500 = 870 410 Intermediate rounding will lose 1 mark overall.

Maths9GB8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9GB8

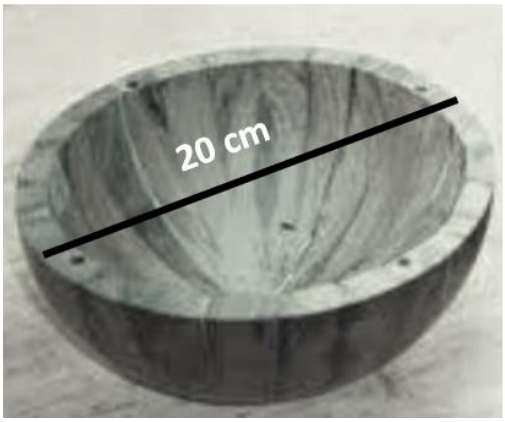
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9GB8	2	2	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to apply concept of surface area and volume to calculate for a hemisphere in a given situation

Sources and diagrams



Source information if copied: https://brainly.in/question/33179133

Question

1 A hemispherical bowl is made up of 1 cm thick bamboo sheet. The outer diameter of the bowl is 20 cm.

Find the cost of painting the inside of the bowl at the rate of ₹ 8 per square cm.

(Use π = 3.14)

(4 marks)

(Total marks 4)

Mark scheme

1. A hemispherical bowl is made up of 1 cm thick bamboo sheet. The outer diameter of the bowl is 20 cm, then find the volume of the bamboo used to make the tank. Find the cost of painting the inside of the bowl at the rate of ₹ 2 per square cm. (Use π = 3.14)	
Answer	Guidance
r = 9cm Surface area = $2\pi r^2 = 508.68$ cm^2 Cost of painting = 508.68 cm^2 × 2 = ₹ 1017.36 Accept answer ₹ 1017 or ₹ 1020	M1 A1 – to find correct inner radius and use correct formula to find surface area of hemispherical bowl M1 A1 – for calculating the cost of painting the hemispherical bowl

Maths9JJ9

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ9

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ9	2	2	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones.	4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the students to construct and interpret bar graphs.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 Sarah is collecting water for irrigating her agricultural land from a canal 2 m deep, 10 m wide and the water flows through the canal at a rate of 2 km/hr.

In every minute she is collecting $\frac{1}{10}^{th}$ of the water flowing through the canal and storing

it in a cubical tank.

If her tank will be fully filled with water in 2 hours, what is the dimension of her tank?

(4 marks)

(Total marks 4)

Mark scheme

1 Sarah is collecting water for irrigating her agricultural land from a canal 2 m deep, 10 m wide and the water flows through the canal at a rate of 2 km/hr. In every minute she is collecting $\frac{1}{10}^{th}$ of the water flowing through the canal and storing it in a cubical tank. If her tank will be fully filled with water in 2 hours, what is the dimension of her tank? (all decimal numbers should be rounded to two decimal places)	
Answer	Guidance
20 m x 20 m x 20 m	M1 – 4 km length of water passing M1 – calculating water stored as 1/10 x 10 x 2 x 4000 A1 – volume of tank = 8000 m^3 A1 – dimensions of tank – cube of side 20 m.

Maths9GB3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9GB3

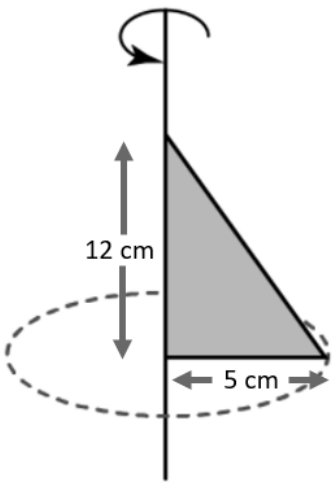
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9GB3		3	C	9M2a Calculate the surface areas and volumes of cubes, cuboids, spheres (including hemispheres) and right circular cylinders/cones	3

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to visualise/generate and compute volume of a solid shape (cone) out of a two-dimensional figure

Sources and diagrams



Source information if copied: https://www.cuemath.com/measurement/right-circular-cone-basics/

Question

1 In a right triangle of given dimensions is revolved about one of its side as shown in the figure.

What is the volume of the solid figure so obtained?

(Use $\pi = \frac{22}{7}$)

(3 marks)

(Total marks 3)

Mark scheme

1 A right triangle of given dimensions is revolved about one of its side as shown in the figure. What is the volume of the solid figure so obtained? (Use $\pi = \frac{22}{7}$)	
Answer	Guidance
314.29 cm^3 Also accept rounded off answer 314.3 cm^3 (or 314.16 or 314.2)	M1 – to find correct radius and height of the cylinder M1 – to find volume of cone, using correct formula A1 – to answer rounded off and in correct unit (cm^3) Calculation = $\frac{1}{3} \times \frac{22}{7} \times 5^2 \times 12 = 314.28571$ cm^3 Do not penalise for using π on calculator (gives 314.159....)

Maths9SM2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9SM2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9SM2	1		N	9N1a Representation of natural numbers, integers, rational numbers (both terminating and non-terminating recurring decimals	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of decimal expansions of rational numbers.

Question

1 The number 0.318564318564318564……is:

A. a natural number
B. an integer
C. a rational number
D. an irrational number

(1 mark)

(Total marks 1)

Mark scheme

1 The number 0.318564318564318564……is:	
Answer	Guidance
C. a rational number (1) Because it is a recurring decimal	M1 for choosing correct option. Accept C), C, (C)

Maths9NK1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NK1

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NK1	1		N	9N1c Know that some numbers such as $\sqrt{2}$ and $\sqrt{3}$ are not rational	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the distinguishing property of Irrational Numbers

Question

1 The decimal expansion of an irrational number is?

A. Terminating Decimal
B. Recurring Decimal
C. Either Terminating or Non- Terminating
D. Non- Terminating and Non- Recurring

Mark scheme

1 The decimal expansion of an irrational number is? A. Terminating Decimal B. Recurring Decimal C. Either Terminating or Non- Terminating D. Non- Terminating and Non- Recurring	
Answer	Guidance
D. Non- Terminating and Non- Recurring	A1 – 1 mark for correct answer

Maths9MS2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9MS2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9MS2	1		N	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type where x and y are natural numbers and a and b are integers.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of expressing irrational numbers as surds

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 Evaluate: $8\sqrt{15} \div 2\sqrt{3}$

(1 mark)

(Total marks 1)

Mark scheme

1 Evaluate: $8\sqrt{15} \div 2\sqrt{3}$	
Answer	Guidance
$4\sqrt{5}$	A1 For correct answer

Maths9NK5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NK5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NK5a	2		N	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type where x and y are natural numbers and a and b are integers.	2
Maths9NK5b	2		N	9N1f Laws of exponents to include rational exponents with positive real bases.	2
Total marks	**4**				**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the properties and simplification process of Real Numbers

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1

1 (a) What would be the denominator after rationalizing $\frac{7}{5\sqrt{3}-5\sqrt{2}}$? (2 marks)

1 (b) Express $\sqrt[4]{\sqrt[3]{3^2}}$ as a single exponent. Show your work

(2 marks)

(Total marks 4)

Mark scheme

<table>
<tr><td colspan="2">1 (a) What would be the denominator after rationalizing $\frac{7}{5\sqrt{3}-5\sqrt{2}}$?</td></tr>
<tr><td>Answer</td><td>Guidance</td></tr>
<tr><td>Point Marking
Rationalizing Factor will be $(5\sqrt{3}+5\sqrt{2})$
Product of $(5\sqrt{3}-5\sqrt{2})^*(5\sqrt{3}+5\sqrt{2})$
Apply Identity $(a+b)(a-b)=(a^2-b^2)$
$=(5\sqrt{3})^2-(5\sqrt{2})^2$
$=(25*3)-(25*2)$
$25(3-2)$
25</td><td>MA 1-
Identity of Rationalizing Factor $(5\sqrt{3}+5\sqrt{2})$
Use of Identity Apply Identity $(a+b)(a-b)=(a^2-b^2)$
Product of $(5\sqrt{3}-5\sqrt{2})^*(5\sqrt{3}+5\sqrt{2})$
Apply Identity $(a+b)(a-b)=(a^2-b^2)$
$=(5\sqrt{3})^2-(5\sqrt{2})^2$
$=(25*3)-(25*2)$
$25(3-2)=25$

M2-
Direct use of $(5\sqrt{3})^2-(5\sqrt{2})^2$
$(25*3)-(25*2)$
$25(3-2)$
25

A1 Correct Solution – 2 marks
A2 – Only R F – 1 mark
A3 – None correct - Zero</td></tr>
<tr><td colspan="2">1 (b) Evaluate : $\sqrt[4]{\sqrt[3]{3^2}}$ Show your work</td></tr>
<tr><td>Answer</td><td>Guidance</td></tr>
<tr><td>Point Marks
$\sqrt[4]{\sqrt[3]{3^2}}$
$=\left(\left(3^2\right)^{1/3}\right)^{1/4}=3^{2/12}$
$=3^{1/6}$
Final Answer = $3^{1/6}$</td><td>M1 – Use of laws of exponents (Multiplication of all roots and power) - 1 mark
Simplification $3^{2/12}$
Final reduction to lowest form $3^{1/6}$ – 1 mark

A1- 2 marks</td></tr>
</table>

Maths9NM5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM5a	2		N	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type $\frac{1}{ax+b\sqrt{x}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$ (where x and y are natural numbers and a and b are integers.	2
Maths9NM5b	2		N	9N1f Laws of exponents to include rational exponents with positive real bases.	2
Total marks	**4**				**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the properties and simplification process of Real Numbers

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1

1 (a) Express $\frac{6}{3\sqrt{2}-2\sqrt{3}}$ with rational denominator.

(2 marks)

1 (b) Express $\sqrt[4]{\sqrt[3]{2^2}}$ as a single exponent. Show your work.

(2 marks)

(Total marks 4)

Mark scheme

<table>
<tr><td colspan="2">1 (a) Express $\frac{6}{3\sqrt{2}-2\sqrt{3}}$ with rational denominator.</td></tr>
<tr><td>Answer</td><td>Guidance</td></tr>
<tr><td>Point Marking
Rationalizing Factor will be (3√2 + 2√3) (1)
Product of (3√2 - 2√3) × (3√2+ 2√3)
Apply Identity (a + b)(a-b) = (a^2-b^2)
= $(3\sqrt{2})^2 – (2\sqrt{3})^2$
= (9*2) – (4*3)
=18-12
=6 (1)</td><td>MA 1-
Identification of Rationalizing factor (3√2 + 2√3)
Product of (3√2 - 2√3)× (3√2+ 2√3)
Apply Identity (a+b)(a-b) = (a^2-b^2)
= $(3\sqrt{2})^2 – (2\sqrt{3})^2$
= (9*2) – (4*3)
=18-12
=6

MA2-
Direct use of $(3\sqrt{2})^2 – (2\sqrt{3})^2$
= (9*2) – (4*3)
=18-12
=6

A1 Correct Solution – 2 marks
A2 – Only Rationalising factor – 1 mark
A3 – None correct - Zero</td></tr>
<tr><td colspan="2">1 (b) Express $\sqrt[4]{\sqrt[3]{2^2}}$ as a single exponent. Show your work.</td></tr>
<tr><td>Answer</td><td>Guidance</td></tr>
<tr><td>Point Marks
$\sqrt[4]{\sqrt[3]{2^2}}$
$=\sqrt[4]{(2^2)^{\frac{1}{3}}}$</td><td>M1 – Use of laws of exponents (Multiplication of all roots and power) - 1 mark
Simplification and
Final answer in the form $2^{\frac{1}{6}}$ – 1 mark</td></tr>
</table>

$=\left(2^{\frac{2}{3}}\right)^{\frac{1}{4}}$ (1) $=2^{\frac{2}{3}\times\frac{1}{4}}$ $=2^{\frac{1}{6}}$ Final Answer = $2^{\frac{1}{6}}$ (1)	A1- 2 marks

Maths9CN6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9CN6

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9CN6a		1	C	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type where x and y are natural numbers and a and b are integers	1
Maths9CN6b		1	C	9N1f Laws of exponents to include rational exponents with positive real bases.	1
Maths9CN6c		2	N	9N1bKnow that a rational number is a terminating decimal if the only prime factors of the denominator are 2 and / or 5, otherwise it is a recurring decimal	2
Total marks		**4**			**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to apply various operations to rational numbers and convert recurring decimal numbers in the form p/q

Question(s)

1 (a) Find the value of $\frac{1+\sqrt{3}}{-1+\sqrt{3}}$ correct to three decimal places.

(1 mark)

1 (b) Determine the value of $6^0 \sqrt[3]{1+\frac{37}{3^3}}$ correct to two decimal places.

(1 mark)

1 (c) Show that 1.999…… is equal to 2.

(2 marks)

(Total marks 4)

Mark scheme

1 (a) Find the value of $\frac{1+\sqrt{3}}{-1+\sqrt{3}}$ correct to three places of decimal.	
Answer	Guidance
$\frac{1+\sqrt{3}}{-1+\sqrt{3}}$ = 3.732	A1 Correct answer
1(b) Determine the value of $6^0 \sqrt[3]{1+\frac{37}{3^3}}$ up to two places of decimal	
Answer	Guidance
$6^0 \sqrt[3]{1+\frac{37}{3^3}}$ = 1.33	A1 Correct answer
1 (c) Show that 1.999…… is equal to 2.	
Answer	Guidance
Let x= 1.9999999…….. (1) 10x = 19.9999….. (2) Sub (1) from (2) 10x – x = 19.9999…. – 1.999999…… 9x = 18 x = $\frac{18}{9}$ = 2	M1 For the method A1 Correct answer

Maths9LK11

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK11

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK11		4	N	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type $\frac{1}{a+b\sqrt{x}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$ (where x and y are natural numbers and a and b are integers.	4

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to rationalize the denominator.

Source(s)

Question(s)

1 Simplify $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$

(4 marks)

(Total marks 4)

Mark scheme

1 Simplify $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$	
Answer	Guidance

1 $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$ On rationalising each term separately $\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} = \frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} \times \frac{\sqrt{10}-\sqrt{3}}{\sqrt{10}-\sqrt{3}}$ $= \frac{7\sqrt{3}(\sqrt{10}-\sqrt{3})}{(\sqrt{10})^2-(\sqrt{3})^2} = \frac{7\sqrt{30}-7\times 3}{(\sqrt{10})^2-(\sqrt{3})^2}$ $= \frac{7(\sqrt{30}-3)}{7} = \sqrt{30} - 3$ (i) $\frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} = \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} \times \frac{\sqrt{6}-\sqrt{5}}{\sqrt{6}-\sqrt{5}} =$ $\frac{2\sqrt{5}(\sqrt{6}-\sqrt{5})}{6-5} = 2\sqrt{30} - 10$ (ii) $\frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}} = \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}} \times \frac{\sqrt{15}-3\sqrt{2}}{\sqrt{15}-3\sqrt{2}} = \frac{3\sqrt{2}(\sqrt{15}-3\sqrt{2})}{(\sqrt{15})^2-(3\sqrt{2})^2} =$ $\frac{3\sqrt{30}-18}{15-9\times 2} = \frac{3(\sqrt{30}-6)}{15-18} = \frac{3(\sqrt{30}-6)}{-3} = 6 - \sqrt{30}$ (iii) Put the values of (i) , (ii) and (iii) in A $= (\sqrt{30} - 3) - (2\sqrt{30} - 10) - (6 - \sqrt{30}) = -3 + 10 - 6 = 1$	M1 to rationalize any of the terms. A1 correct answer any one term M1 attempting to rationalise all three terms individually A1 Correct answer of 1.

Maths9LK12

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK12

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK12a		2	C	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type $\frac{1}{a+b\sqrt{x}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$ (where x and y are natural numbers and a and b are integers.	2
Maths9LK12b		2	C	9N1e Rationalization (with precise meaning, i.e. that the denominator is an integer) of real numbers of the type $\frac{1}{a+b\sqrt{x}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$ (where x and y are natural numbers and a and b are integers.	2
Total marks		**4**			**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability to rationalize the denominator.

Source(s)

Question(s)

1 If x = 1 - $\sqrt{2}$ then find the value of

1 (a) $x + \frac{1}{x}$ with a rational denominator

(2 marks)

1 (b) $x^2 + \frac{1}{x^2}$ with a rational denominator

(2 marks)

(Total marks 4)

Mark scheme

1 (a) $x + \frac{1}{x}$ (up to three decimal places)	
Answer	Guidance
-2.828 x = 1 - $\sqrt{2}$ then $\frac{1}{x}=\frac{1}{1-\sqrt{2}}$ and rationalising the denominator $\frac{1}{x}=\frac{1}{1-\sqrt{2}} \times \frac{1+\sqrt{2}}{1+\sqrt{2}}$ $= \frac{(1+\sqrt{2})}{1^2-\sqrt{2}^2} = \frac{(1+\sqrt{2})}{1-2} = -(1+\sqrt{2})$ Therefore $x + \frac{1}{x}$ = (1 - $\sqrt{2}$) +{-(1 + $\sqrt{2}$)} = 1 - $\sqrt{2}$ - 1 - $\sqrt{2}$ =- 2 $\sqrt{2}$ =-2 x 1.414 = -2.828	M1 to rationalise and to find the value of 1/x A1 to find the correct value of $x + \frac{1}{x}$
1 (b) $x^2 + \frac{1}{x^2}$	

Answer	Guidance
6 $x^2 = (1 - \sqrt{2})^2 = 1 - 2\sqrt{2} + 2 = 3 - 2\sqrt{2}$ (i) $\frac{1}{x^2} = \{-(1 + \sqrt{2})^2\} = 1 + 2\sqrt{2} + 2 = 3 + 2\sqrt{2}$ (ii) By adding (i) and (ii) $x^2 + \frac{1}{x^2} = 3 - 2\sqrt{2} + 3 + 2\sqrt{2} = 6$	M1 for finding the value of x^2 and $1/x^2$ A1 to write correct value of $x^2 + \frac{1}{x^2}$.

Maths9IM4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM4	1		N	9N1f Laws of exponents to include rational exponents with positive real bases	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the application of logical reasoning in classifying real numbers, proving their properties and using them in different situations.

Question

1 Find the value of $343^{\frac{-1}{3}}$.

A. -7
B. $\frac{-1}{7}$
C. $\frac{1}{7}$
D. 7

(1 mark)

(Total marks 1)

Mark scheme

1 Find the value of $343^{\frac{-1}{3}}$

A. -7
B. $\frac{-1}{7}$
C. $\frac{1}{7}$
D. 7

Answer	Guidance
C. $\frac{1}{7}$	M1 for choosing correct option. Accept c), c, $\frac{1}{7}$

Maths9SM1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9SM1

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9SM1	1		N	9N1f Laws of exponents to include rational exponents with positive real bases.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of conversion of a number into exponential form.

Question

1 The earth has a surface area of approximately 510 100 000 km^2. Express this in SI units (in square m).

A. 5.101 x 10^8 m^2
B. 5.101 x 10^{11} m^2
C. 5.101 x 10^{14} m^2
D. 5101 x 10^{11} m^2

(2 marks)

(Total marks 2)

Mark scheme

1. The earth has a surface area of approximately 510100000 km^2.Express it in SI units. (in square m).	
Answer	Guidance
C. 5.101 x 10^{14} m^2	M1 for choosing correct option. Accept C), C, (C)

Maths9BS2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9BS2

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9BS2	1		N	9N1f Laws of exponents to include rational exponents with positive real bases.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of exponents and laws of exponents. …

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 What is the value of $(1^3 + 2^3 + 3^3)^{\frac{1}{2}}$

A. 4
B. 6
C. 8
D. 10

(1 mark)

(Total marks 1)

Mark scheme

1 What is the value of $(1^3 + 2^3 + 3^3)^{\frac{1}{2}}$ A. 4 B. 6 C. 8 D. 10	
Answer	Guidance
B. 6 $1^3+2^3+3^3=36$, and $36^{1/2}=6$	A1 : For correct answer

Maths9LK4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9LK4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9LK4	1		N	9N1f Laws of exponents to include rational exponents with positive real bases.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the student to use the laws of exponents to solve the examples.

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question(s)

1 Find the value of $\sqrt[4]{(256)^{-3}}$

A. 1/64
B. 1/16
C. 1/4
D. 16

(1 mark)

(Total marks 1)

Mark scheme

1 Find the value of $\sqrt[4]{(256)^{-3}}$ A. 1/64 B. 1/16 C. 1/4 D. 16	
Answer	Guidance
A. 1/64	A1 – to write correct answer

Maths9BS5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9BS5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9BS5	1	1	N	9N1f Laws of exponents to include rational exponents with positive real bases.	2

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the knowledge of rationalisation of Surds.

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 Simplify: $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$

(2 marks)

(Total marks 2)

Mark scheme

1 Simplify: $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$	
Answer	Guidance
0	$\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225}$ M1 : 3- 8×6 + 15×2+ 15 3 - 48+ 15+ 30 A1: =0 (Total marks 2)

Maths9RS7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9RS7

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9RS7a	1		N	9S1a collection of data	1
Maths9RS7b	1		N	9S1a collection of data	1
Maths9RS7c	1		N	9S1a collection of data	1
Total marks	**3**				**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the concept of collection of data and interpret the data.

Source(s)

Source information: book/journal, author, publisher, website link etc.

Question(s)

1 The weights of new born babies in kg are recorded by a hospital to maintain their records. On a particular day following weights are recorded:

3.4, 2.7, 2,5, 3.7, 2.1, 3.5, 2.7, 2.2, 4.0, 2.6, 3.3, 3.0, 3.1,

1 (a) Find the range of the data.

(1 mark)

1 (b) How many babies weigh below 3.0 kg.

(1 mark)

1 (c) What is the mean weight.

(1 mark)

(Total 3 marks)

Mark scheme

1 (a) Find the range of the data (1 mark)	
Answer	Guidance
Range = Highest observation – lowest observation = 4.0 – 2.1 = 1.9 kg	A1 For correct answer
1 (b) How many babies weigh below 3.0 kg (1 mark)	
Answer	Guidance
6 babies weigh less than 3 kg	A1 For correct answer
1 (c) What is the mean weight. (1 mark)	
Answer	Guidance
Mean weight = sum of all observation / total number of observation $= \frac{38.8}{13}$ = 2.9846 ... kg = 3.0 kg.	A1 for correct answer Allow 2.98, 3.0 and 3 as correct values

Maths9NM6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM6

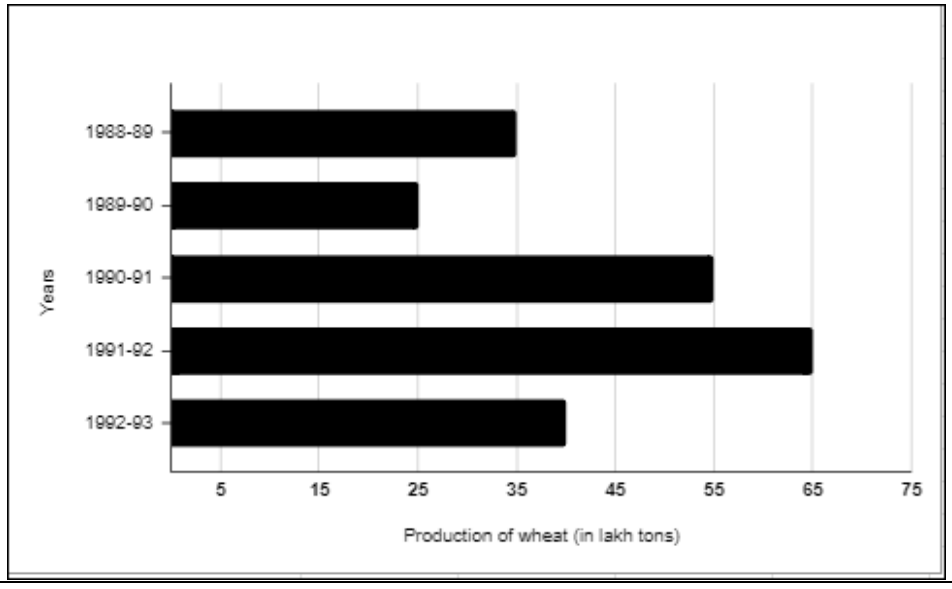
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM6a	1		N	9S1b Presentation of data — construct and interpret bar graphs.	1
Maths9NM6b	3		N	9S1b Presentation of data — construct and interpret bar graphs	3
Total marks	**4**				**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the analysis and interpretation of data from the given bar graph

Sources and diagrams



Source information: excel

Question

1 Read the above bar graph and answer the following questions.

1 (a) What was the quantity of wheat production in the year 1990-91?

(1 mark)

1 (b) What is the difference between the maximum and minimum production of wheat in the time span of 1988-93

(3 marks)

(Total marks 4)

Mark scheme

1 (a) What was the quantity of wheat production in the year 1990-91?	
Answer	Guidance
Point Marking Length of the bar graph for the year 1990-91 = 55 Production of wheat in the year 1990-91 is 55 lakh tons. (1)	MA 1- Interpretation of data from the bar graph A1-1 mark for correct answer.
1 (b) What is the difference between the maximum and minimum production of wheat in the time span of 1988-93	
Answer	Guidance
In the year 1991-92, production of wheat is maximum and is equal to 65 lakh tons. (1) In the year 1989-90, production of wheat is minimum and is equal to 25 lakh tons. (1) The difference between the maximum and minimum production= 65 lakh tons - 25 lakh tons = 40 lakh tons (1)	M1 – Use of interpretation of data from the bar graph - 1 mark M1 – Use of interpretation of data from the bar graph - 1 mark M2-Simplification and final answer- 1 mark A2- 3 marks

Maths9IM9

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM9

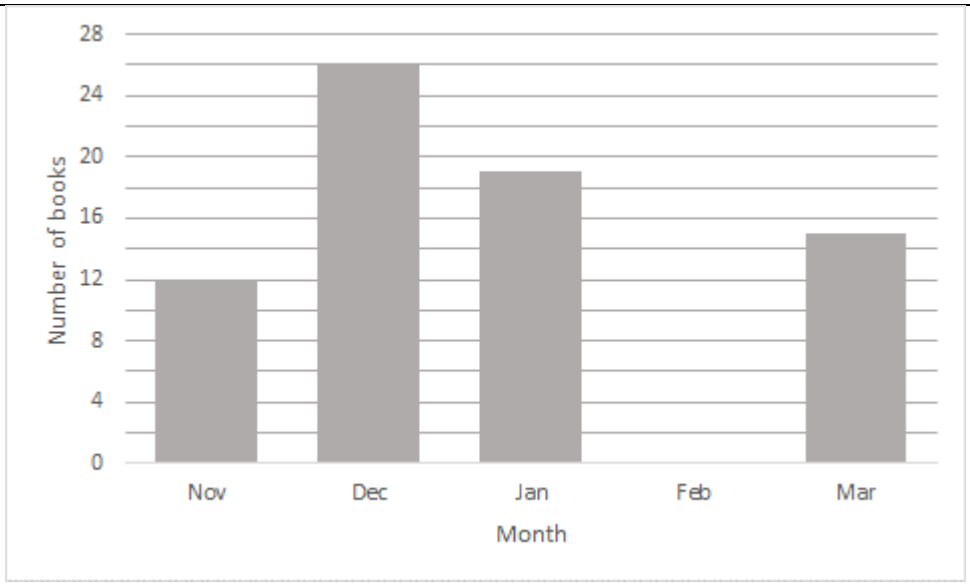
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM9a	1	1	C	9S1b - Presentation of data — construct and interpret bar graphs	2
Maths9IM9b	1		C	9S1b - Presentation of data — construct and interpret bar graphs	1
Total marks	**2**	**1**			**3**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding and ability to interpret data from bar graphs and plot them correctly.

Sources and diagrams



Question(s)

1 Sonia runs a library in her neighbourhood. She keeps a track of the number of children's books issued each month. The graph shows the number of children's book issued over a period of five months, from November to March next year.

1 (a) If the total number of books issued over these five months is 85, how many children's books were issued in the month of February?

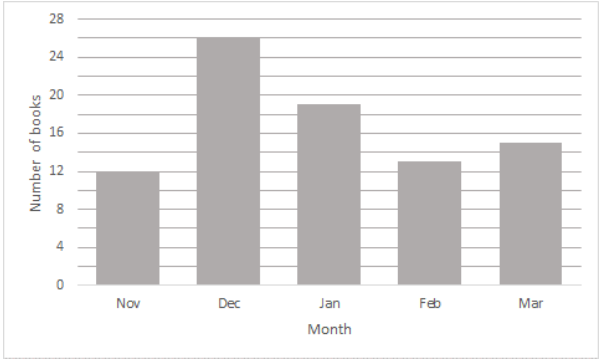
(2 marks)

1 (b) Draw and complete the graph on the graph paper provided.

(1 mark)

(Total marks 3)

Mark scheme

1 (a) If the total number of books issued over these five months is 85, how many children's books were issued in the month of February?	
Answer	Guidance
Total books issued in 5 months = 85 Sum of the books shown in the graph = 72 (1) Therefore, books issued in Feb21 = 85 - 72 = 13 Answer :13 (1)	 M1 Sum of given frequencies Correct response only A1 Correct response only
1 (b) Draw and complete the graph on the graph paper provided.	
Answer	Guidance
Complete graph with correct heights and width (1) 	M1 Correct depiction of bar heights

Maths9AN8

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN8

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN8a	3		N	9S1b Presentation of data — construct and interpret bar graph	3
Maths9AN8b	3		E	7N3c Convert between percentages, fractions and decimals	3
Total marks	**6**				**6**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses student's ability to represent and interpret data using Bar graph .

Sources and diagrams

Political Party	A	B	C	D	E	F
Seats won	75	55	37	29	10	37

Source information: Xam idea Mathematics - IX

Question(s)

1 Given above are the seats won by different political parties in the polling outcome of the state assembly elections.

1 (a) Draw a bar graph to represent the polling results.

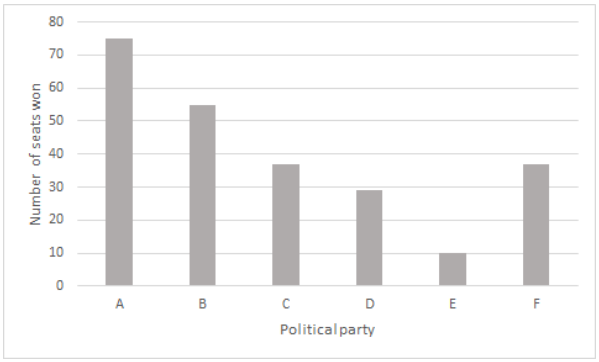
(3 marks)

1 (b) Which political party won the largest number of seats? Calculate the percentage of seats won by that party.

(3 marks)

(Total marks 6)

Mark scheme

1 (a) Draw a bar graph to represent the polling results.	
Answer	Guidance
	M1- To label Political party on the X axis and Number of seats on Y Axis M1- Correct mention of scale used. A1- Correct display of bars If 3 or more bars are displayed incorrect a zero must be given
1 (b) Which political party won the largest number of seats? Calculate the percentage of seats won by that party.	
Answer	Guidance
Party A, 30.68% PARTY A Total seats = 243	A1: correct answer only Other acceptable answers are A, Party A etc

Percentage of seats won by A $= \frac{75}{243} \times 100$ $= 30.68\%$ (accept 30.7%, 31%)	M1: Calculating the correct number of total seats. A1: Correct answer of percentage Do not penalize the student if the percentage sign is omitted.

Maths9NK3

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NK3

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NK3		1	E	9S1b Presentation of data — construct and interpret bar graphs	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of basic elements of grouped data in statistics

Sources and diagrams

Question

1 If ‘m’ is the mid-point and ‘l’ is the lower-class limit of a class in a continuous frequency distribution. What is the upper-class limit of the class?

A. $2m + l$
B. $2m – l$
C. $m – l$
D. $m – 2l$

(1 mark)
(Total marks 1)

Mark scheme

1 If ‘m’ is the mid-point and ‘l’ is the lower-class limit of a class in a continuous frequency distribution. What is the upper-class limit of the class?

A $2m + l$
B $2m – l$
C $m – l$
D $m – 2l$

Answer	Guidance
B. $2m - l$ Example 5-15 Class Interval Mid point = 10 2 * mid point = 20 l =5 hence Upper limit = $20\text{-}5 = 15$	A1 – 1 mark for correct answer No explanation required

Maths9JJ1

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ1

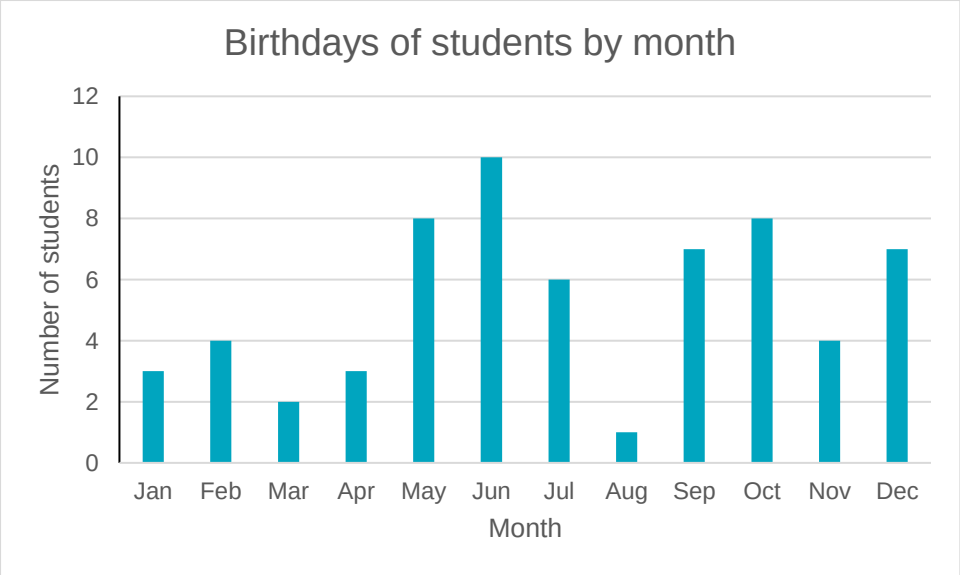
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ1		1	N	9S1b Presentation of data — construct and interpret bar graphs	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of student to interpret bar graphs

Sources and diagrams



Question

1 The Bar Graph shows the month of birthday of class 9 students in a school.

Which month has the most birthdays?

A. May
B. June
C. September
D. October

(1 mark)

(Total marks 1)

Mark scheme

1 The Bar Graph shows the month of birthday of class 9 students in a school. Which month has the most birthdays?	
Answer	Guidance
B. June	1 mark for the correct answer

Maths9DP7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9DP7

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9DP7	2	1	C	9S1b Presentation of data — construct and interpret bar graphs, histograms (with varying base lengths), frequency polygons for data given in various forms: ungrouped / grouped data in list or tables.	3

*Calculator required, N = Calculator not allowed, E = Either

Item purpose

This question assesses the ability of the student to interpret the given data.

Sources and diagrams

Question

1 A costumer can withdraw cash as per the table given below from an ATM 8 times without charges.

S.NO.	Type of Debit Card	Minimum amount	Maximum amount
1	CLASSICAL	RS. 100	RS.20,000
2	MAESTRO	RS.100	RS.20.000
3	GLOBAL	RS. 100	RS.40,000
4	GOLD INTERNATIONAL	RS.100	RS.50,000
5	PLATINUM INTERNATIONAL	RS.100	RS.100,000

An Indian family has all 5 kinds of cards.

If all 5 cards are needed to be used maximum number of times, then how many times in all will all 5 cards be used? Also, calculate how much money in all could be withdrawn if all cards are used maximum number of times?

(3 marks)

(Total marks 3)

Mark scheme

1 If all 5 cards are used the maximum number of times without charge, then how many times in all will all cards be used? Also, calculate how much money in all could be withdrawn if all cards are used the maximum number of times without charge?	
Answer	Guidance
40 times RS 1,840,000	A1 5x8=40 M1 for showing 20,000+20,000+40,000+50,000+100,000=230,000or some attempt to calculate amount on different cards. 230,000×8=1,840,000 A1 for correct answer. Don’t penalise if rupees is not written.

Maths9NK7

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NK7

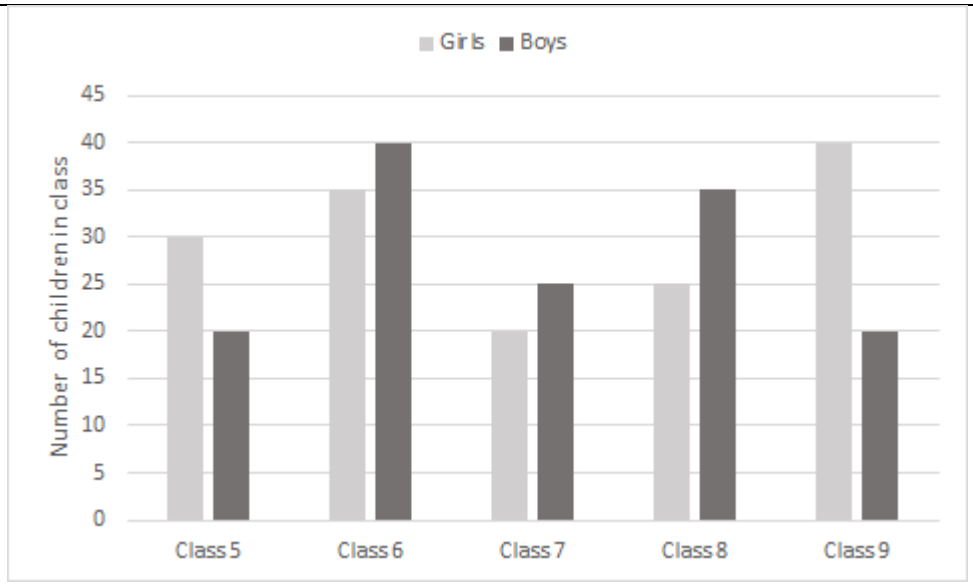
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NK7a	1		N	10S2a Calculate probabilities based on scenarios involving equally likely outcomes.	1
Maths9NK7b		3	N	9S1b Presentation of data — construct and interpret bar graphs	3
Total marks	**1**	**3**			**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the concept of probability and Mean of data

Sources and diagrams



Source information if copied: https://www.teachoo.com/

Question(s)

1

1 (a) From a group of 20 boys and 18 girls, a child is selected to represent the school in an interschool debate competition. Find the probability of this child being a girl.

(1 mark)

1 (b) The bar graph shown above shows gender distribution in St. Mira's Public School in Mumbai. Which gender outnumbers the other and by how much, if all levels are considered from Class 5 to Class 9?

(3 marks)

(Total marks 4)

Mark scheme

1 (a) From a group of 20 boys and 18 girls, a child is selected to represent the school in an interschool debate competition. Find the probability of this child being a girl.	
Answer	Guidance
Number of students – $20 + 18 = 38$ Number of Girls – 18 P (Girl being chosen) = $18/38$ P (Girl) = $9/19$	MA 1- Use of appropriate formula Denominator -38 Numerator – 18 Ratio = $18/38 = 9/19$ A1- Correct Answer – 1 mark
1(b) The bar graph shown above shows gender distribution in St. Mira's Public School in Mumbai. Which gender outnumbers the other and by how much, if all levels are considered from Class 5 to Class 9?	
Answer	Guidance
Point Marks Step 1 - Observation of Graph represents Girls in each Class level. Class 5 – 30 Class 6 – 35	M1 – Step 1 – Observation and identification of Total girls for each class Step 2 – Observation and identification of Total Boys for each class

Class 7 –20 Class 8 – 25 Class 9 –40 Step2 Boys in each Class level. Class 5 – 20 Class 6 – 40 Class 7 –25 Class 8 –35 Class 9 –20 Step3 Total Girls– 30 +35+20+25+40 = 150 Total Boys –20+40+25+35+20 = 140 Girls Outnumber Boys by 10	Step 3 – Addition of all classes for each gender & calculate the difference. A1 -Explanation and correct steps to reach the answer – 3 marks A2 – Correct steps but incorrect answer due to error in last step – 2 marks A3 – Step1 correct, Step 2 and 3 incorrect – 1 mark A4- None correct - Zero

Maths9JJ5

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9JJ5

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9JJ5a	2		N	9N3d Calculate a number as a percentage of another	2
Maths9JJ5b		2	N	9S1b Presentation of data — construct and interpret bar graphs	2
Total marks	**2**	**2**			**4**

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of the students to construct and interpret bar graphs.

Sources and diagrams

Items	Grocery	Education	Water	Medicine	Fuel	Entertainment	Miscellaneous	Electricity	Mobile
Expenditure (in thousands)	8	7	1	2	3	2	3	2	2

Source information if copied: book/journal, author, publisher, website link etc.

Question(s)

1 A family with a monthly income of Rs. 30,000 had planned the expenditure per month under various heads as shown the table above.

1 (a) What percentage of the total monthly income is allotted for Grocery and Education?

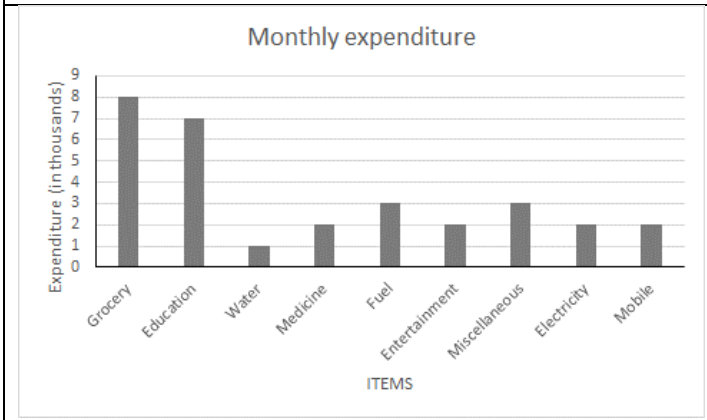
(2 marks)

1 (b) Represent the given information using a Bar Graph.

(2 marks)

(Total marks 4)

Mark scheme

1(a) What percentage of the total monthly income is allotted for Grocery and Education?	
Answer	Guidance
50% (15 out of total of 30)	M1- Percentage = (total expenditure for grocery and education/total monthly income) x100 A1: 1 mark for correct answer Don't penalize if % symbol is not written.
1(b) Represent the given information using a Bar Graph.	
Answer	Guidance
	A1 for graph structure (items and scale shown) A1 for bars plotted correctly.

Maths9GB6

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9GB6

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9GB6	1	1	C	9S1c Calculate mean, median and mode of ungrouped data.	2

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to calculate median of a given data in real-life context

Sources and diagrams

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 The heights (in cm) of ten students of a study group are as follows:

155, 160, 145, 149, 150, 147, 145, 152, 144, and 148

Find the median height of the group of students.

(2 marks)

(Total marks 2)

Mark scheme

1 The heights (in cm) of ten students of a study group are as follows: 155, 160, 145, 149, 150, 147, 145, 152, 144, and 148 Find the median height of the group of students	
Answer	Guidance
148.5 cm	M1 – for attempt to order heights to identify 5^{th} & 6^{th}

Accept 148.5, without mention of unit	A1 for correct answer Explanation: Ascending order: 144, 145, 145, 147, 148, 149, 150, 152, 155, 160 Median = $\frac{5th+6th\ observation}{2}$ = 148.5 cm

Maths9NM4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9NM4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9NM4	1		C	9S2a Calculate estimates of probabilities based on observed frequency of outcomes.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the ability of computing the probability of an event from a given frequency distribution table.

Sources and diagrams

	Outcomes	3 heads	2 heads	1 head	No head	
	Frequency	56	144	154	46	

Question

1 Three coins are tossed simultaneously 400 times with the frequencies of different outcomes as given in the above table. The probability of getting at least 2 heads is best estimated as:

A. 0.36
B. 0.14
C. 0.385
D. 0.5

(1 mark)

(Total marks 1)

1 Three coins are tossed simultaneously 400 times with the frequencies of different outcomes as given in the above table. The probability of getting at least 2 heads is: A. 0.36 B. 0.14 C. 0.385 D. 0.5

Answer	Guidance
D. 0.5 (1) Required Probability: P(2heads or 3 heads)=P(2 heads)+P(3 heads)= $\frac{144}{400}+\frac{56}{400}=\frac{200}{400}=0.5$ Alternately, P(getting at least 2 heads)=P(getting 2 or more heads)= $\frac{144+56}{400}=\frac{200}{400}=0.5$	A1 – 1 mark for correct answer

Maths9IM2

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9IM2

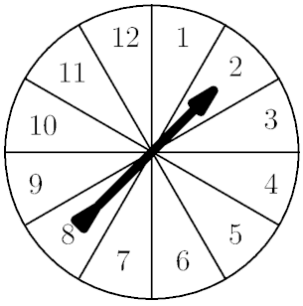
Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9IM2	1		N	9S2a Calculate estimates of probabilities based on observed frequency of outcomes.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the understanding of calculating empirical probability.

Sources and diagrams



Question

1 A fair spinning wheel is numbered from 1 to 12. What is the probability of spinning a number which is a perfect square?

A. $\frac{1}{6}$
B. $\frac{1}{4}$
C. $\frac{1}{3}$
D. $\frac{1}{2}$

(1 mark)

(Total marks 1)

Mark scheme

1 A fair spinning wheel is numbered from 1 to 12. What is the probability of spinning a number which is a perfect square?	
Answer	Guidance
B. $\frac{1}{4}$ (1) Squares are 1, 4 and 9	M1 for choosing correct option. Accept b), b, $\frac{1}{4}$

Maths9AN4

This assessment item is designed to assess the end of class assessments for CBSE schools.

Subject	Class	Question reference/Filename
Maths	9	Maths9AN4

Item identity	AO1 marks	AO2 marks	C/N/E*	Content Reference(s)	Marks
Maths9AN4	1		C	9S2a Calculate estimates of probabilities based on observed frequency of outcomes.	1

*C = Calculator required, N = Calculator not allowed, E = Either

Item purpose

The question assesses the student's ability to calculate empirical probability under given outcomes of an event.

Sources and diagrams

Outcome	1	2	3	4	5	6
Frequency	42	65	50	53	60	30

Source information if copied: book/journal, author, publisher, website link etc.

Question

1 A die is thrown 300 times with frequencies of outcomes of 1,2 ,3 ,4 ,5 and 6 as given in the table above. The best estimate of the probability of getting an even number is:

:

A. $\frac{35}{75}$

B. $\frac{36}{75}$

C. $\frac{37}{75}$

D. $\frac{38}{75}$

(1 mark)

(Total marks 1)

Mark scheme

1 A die is thrown 300 times with frequencies of outcomes of 1,2 ,3 ,4 ,5 and 6 as given in the following table. The best estimate of the probability of getting an even number is: A. $\frac{35}{75}$ B. $\frac{36}{75}$ C. $\frac{37}{75}$ D. $\frac{38}{75}$	
Answer	Guidance
C. $\frac{37}{75}$	A1: Correct answer only Other acceptable answers: C, $\frac{37}{75}$