CLASS
10

PHYSICS WALLAH

CBSE

15 SAMPLE QUESTION PAPERS

WITH CHEAT SHEETS &
100 MOST PROBABLE QUESTIONS

MATHEMATICS
STANDARD

WITH CBSE SQP, APQ & 2024 SOLVED PAPER

ADHERED TO COMPETENCY BASED LEARNING

2025
EXAMINATION

How to Rock Your Board Exams?

Admit Card: Double-check your admit card before heading to the exam center.

Stationary: Bring pens, pencils, erasers, sharpeners, ruler, and a geometry box. Ensure working pens with sufficient ink and carry spares.

Water bottle and wrist watch: Bring a transparent water bottle for hydration and a wrist watch to monitor time; avoid digital watches which may not be permitted.

Arrive Early at the Examination Center: Arrive before your admit card's reporting time for smooth security checks and room location.

Read the Instructions carefully: Read the instructions of the paper carefully to know the format, marking and special guidelines. Ask the invigilator for any doubts about instructions.

Manage your Time: Assign time for each section/question based on allotted marks and adhere to it for effective time management.

Don't Panic: If you find the paper difficult, remember that everyone else is likely feeling the same way. Stay focused, do your best, and don't let anxiety take over.

Start with your Strengths: Start with your strongest section/question to boost confidence for tougher parts.

Answer clearly and neatly: Write neatly, use headings, subheadings, and bullets for clarity and fetching more marks. Start with margins on both sides. This sets a structured format for your answers.

Don't spend too much time on one question: If a question is challenging or time-consuming, move on and revisit it later if possible. Avoid getting stuck on a single question.

Use of HB pencil: HB pencils produce a relatively dark and easily readable mark. Try to use HB pencils while making diagrams in the exam.

Attempt all questions: Even if unsure, attempt all questions; there is no negative marking in CBSE exams.

SELF ASSESSMENT

Self-assessment plays a crucial role in exam preparation and offers several advantages:

- **Enhanced Self-awareness:** Self-assessment sheets help students gain a deeper understanding of their strengths and weaknesses across various subjects. Specific feedback on their performance provides valuable insights into areas of excellence and those that require improvement.
- **Focused Study:** These sheets provide clear guidance to students on where to direct their efforts. Identifying which questions to review, reattempt, or practice allows for more efficient and purposeful study sessions.
- **Targeted Improvement:** By categorizing questions into different categories (e.g., Easy, Revise, Reattempt), students can concentrate on areas that require the most attention. This targeted approach can result in significant improvements in their comprehension and performance.
- **Motivation:** Self-assessment sheets serve as a source of motivation for students. Observing their progress and understanding the steps needed for improvement can boost their motivation to work harder and achieve better results.
- **Reduced Exam Anxiety:** Having a clear understanding of their preparation progress helps reduce exam-related anxiety. Students feel more confident when they know what aspects to focus on, leading to a calmer and more effective exam experience.
- **Time Management:** Self-assessment sheets aid students in managing their study time more effectively. They can allocate more time to areas requiring extensive revision or reattempt while spending less time on topics they have already mastered.

Self evaluation Instruction: After completing the test, evaluate it using the provided explanations. Use only a pencil to mark the evaluations (allowing for revisions and reattempts). Record the marks obtained in the Marks section and provide remarks in the Remarks column.

Remarks abbreviations:

- **Easy (E):** Use for questions that you should find straightforward, indicating a good understanding and correct answers.
- **Revise (R):** Assign to questions where your response contains minor errors or gaps in understanding, suggesting the need for topic review.
- **Reattempt (RA):** Use for questions with incorrect responses, significant misconceptions, or a lack of understanding. Students receiving this remark should revisit the topic thoroughly, seek additional help if necessary, and attempt similar questions to enhance their grasp of the concept.

	CBSE 2024 paper	CBSE SQP 1	CBSE SQP 2	SQP 1		SQP 2		SQP 3		SQP 4		SQP 5	
S.No.	Remarks	Remarks	Remarks	Marks	Remarks	Marks	Remarks	Marks	Remarks	Marks	Remarks	Marks	Remarks
Q.1													
Q.2													
Q.3													
Q.4													
Q.5													
Q.6													
Q.7													
Q.8													
Q.9													
Q.10													
Q.11													
Q.12													
Q.13													
Q.14													
Q.15													
Q.16													
Q.17													
Q.18													
Q.19													
Q.20													
Q.21													
Q.22													
Q.23													
Q.24													
Q.25													
Q.26													
Q.27													
Q.28													
Q.29													
Q.30													
Q.31													
Q.32													
Q.33													
Q.34													
Q.35													
Q.36													
Q.37													
Q.38													
Total													

INSTRUCTIONS FOR FILLING THE OMR SHEET

- Use a black or blue ballpoint pen to fill the OMR sheet. Pencils or gel pens are not allowed.
- Carefully read the instructions given on the OMR sheet before filling it out.
- While filling the name, leave a block between your first name, middle and last name.
- The student has to fill the following particulars in the answer sheet:

From Admit Card

1. Subject
2. Sub Code
3. Date of Examination
4. Candidate's Name
5. Father's Name
6. Roll No. (In digits)
7. Roll No. (In words)
8. Centre No.
9. School No.

From Question Paper

10. Set Number
11. Code Number

ADMIT CARD

CENTRAL BOARD OF SECONDARY EDUCATION, DELHI

ADMIT CARD FOR SECONDARY EXAMINATION 2024

LATEST ENTRY IN EXAMINATION CENTRE 30 MIN BEFORE THE EXAM START 10 AM (IST)

Roll No. (6) **22122532** **Date of Birth** **26/02/2019** **School No.** (9) **65345** **Centre No.** (8) **8407**

Roll. No. (In words) (7) **TWO CRORE TWENTY ONE LAKH TWENTY TWO THOUSAND FIVE HUNDRED THIRTY TWO ONLY**

RAHUL KUMAR SINGH
11-09-2022

Examination	SECONDARY - CLASS: 10
Candidate's Name (4)	RAHUL KUMAR SINGH
Mother's Name	REKHA DEVI
Father/Guardian's Name (5)	OM PRAKASH SINGH
of School	**********
Exam Centre	**********
Category of PwD	Not Applicable
Admit Card ID	RR536521

SUB CODE (2)	SUBJECT NAME (1)	MEDIUM	DATE (3)
002	HINDI COURSE-A	...	21.02.2024
184	ENGLISH (LANGUAGE AND LITERATURE)	...	26.02.2024
086	SCIENCE	...	02.03.2024
087	SOCIAL SCIENCE	...	07.03.2024
041	MATHEMATICS STANDARD	...	11.03.2024

QUESTION PAPER

Series WYXZ1/4

(10) **Set No. 2**

(11) Q.P. Code **2/4/2**

Roll No.

2	2	1	2	2	5	3	2

Candidates must write the Q.P. Code on the title page of the answer book.

Note: The details provided in the admit card are imaginary; if you found something resembling anyone's details, then it could be by chance.

केन्द्रीय माध्यमिक शिक्षा बोर्ड, दिल्ली
सीनियर स्कूल सर्टिफिकेट परीक्षा (कक्षा बारहवीं)
परीक्षार्थी प्रवेश-पत्र के अनुसार भरे

CENTRAL BOARD OF SECONDARY EDUCATION, DELHI
Secondary School Examination (Class-X)
To be filled in by the candidate as per as per Admit Card
लिखे तथा संगत गोले को पूरे गहरे निशान से भरें।
Write and darken the appropriate circle as applicable.

क्रम संख्या
Serial No.

SAMPLE

विषय **Subject:** MATHEMATICS STANDARD

विषय कोड **Subject Code:** 041

परीक्षा का दिन एवं तिथि
Day & Date of the Examination: MONDAY 11/03/2024

उत्तर देने का माध्यम
Medium of answering the paper: ENGLISH

प्रश्न पत्र के ऊपर लिखे कोड को दर्शाएं: **Write code No. as written on the top of the question paper**	**Code Number**	**Set Number**
	2/4/2	① ● ③ ④

अतिरिक्त उत्तर-पुस्तिका (ओं) की संख्या
No. of supplementary answer-book(s) used

विकलांग व्यक्ति: हाँ / नहीं
Person with Disabilities: Yes / No — NO

किसी शारीरिक अक्षमता से प्रभावित हो तो संबंधित वर्ग में ✓ का निशान लगाऐं।

If physically challenged, tick the category

B	D	H	S	C	A

B = दृष्टिहीन, D = मूक व बधिर, H = शारीरिक रूप से विकलांग,
S = स्पास्टिक, C = डिस्लेक्सिक, A = ऑटिस्टिक

B = Visually Impaired, D = Hearing Impaired, H = Physically Challanged
S = Spastic, C = Dyslexic, A = Autistic

क्या लेखन - लिपिक उपलब्ध करवाया गया: हाँ / नहीं
Whether writer provided: Yes / No — NO

यदि दृष्टिहीन है तो उपयोग में लाए गये सोफ्टवेयर का नाम:
If Visually challenged, name of software used:

एक खाने में एक अक्षर लिखें। नाम के प्रत्येक भाग के बीच एक खाना रिक्त छोड़ दें। यदि परीक्षार्थी का नाम 24 अक्षरों से अधिक है, तो केवल नाम के प्रथम 24 अक्षर ही लिखें।
Each letter be written in one box and one box be left blank between each part of the name. In case Candidate's Name exceeds 24 letters, write first 24 letters.

परीक्षार्थी का नाम बड़े अक्षरों में **Candidate's Name in CAPITAL letters**

R	A	H	U	L		K	U	M	A	R		S	I	N	G	H										

अनुक्रमांक
Roll No.

2	2	1	2	2	5	3	2

As per Admit Card

विषय कोड **Sub. Code**

0	4	1

केन्द्र संख्या **Centre No.**

8	4	0	7

विषय **Subject:** MATHEMATICS STANDARD

School No. as per admit card: विद्यालय संख्या जैसा प्रवेश पत्र में दिया गया है।

6	5	3	4	5

अनुक्रमांक (शब्दों में) **Roll No. (in words)** TWO Crore TWENTY ONE Lakhs TWENTY TWO Thousands FIVE HUNDRED THIRTY TWO ONLY

पिता/संरक्षक का नाम
Father's/Guardian's Name: OM PRAKASH SINGH

परीक्षार्थी के हस्ताक्षर **Signature of Candidate:** *(Candidate's signature in black/blue ballpoint pen)*

कार्यालय उपयोग के लिए
Space for office use

इस पृष्ठ पर परीक्षार्थी द्वारा भरे गए सम्पूर्ण विवरण की जांच कर ली गई है।
All the particulars filled in by the candidate on this page have been verified

सहायक अधीक्षक के हस्ताक्षर
Signature of Asstt. Supdt.

अधीक्षक की मोहर
Facsimile sstamp of the Centre supdt.

Chapter Wise Weightage & Trend analysis

CBSE PAST 5 YEARS' PAPERS

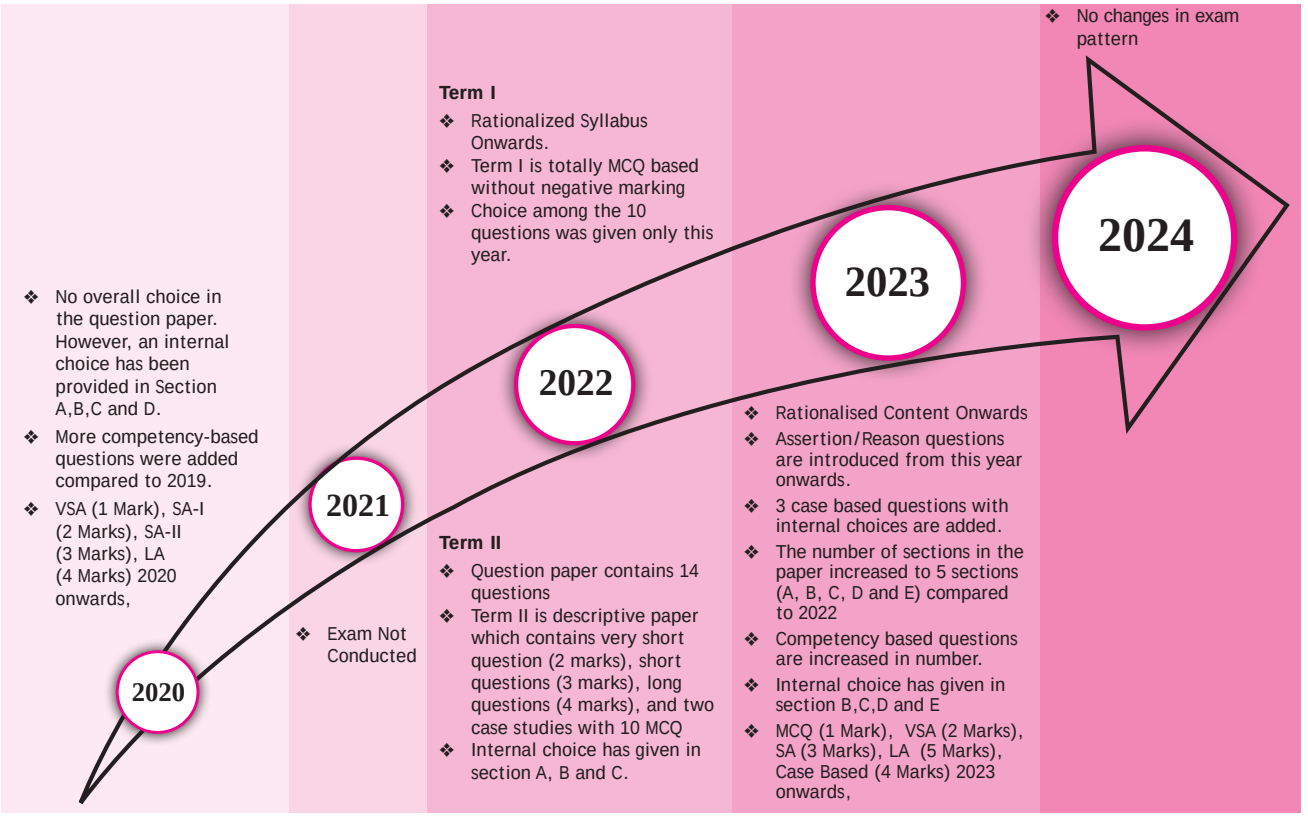
MATHEMATICS										
CHAPTERS	2020		2021	2022		2023		2024	
	DL	ODL		DL	ODL	DL	ODL	DL	ODL
Real Numbers	6	6	Exam not Conducted	–	–	6	6	6	6
Polynomials	8	3		–	–	4	3	3	5
Pair of Linear Equations in Two Variables	4	8		–	–	5	4	6	6
Quadratic Equations	3	7		6	5	6	5	5	4
Arithmetic Progressions	8	5		4	5	5	6	6	5
Triangles	7	7		–	–	7	7	7	8
Coordinate Geometry	6	6		–	–	6	8	6	6
Introduction to Trigonometry	5	7		–	–	6	6	7	7
Some Applications of Trigonometry	7	5		7	7	6	6	5	5
Circles	4	4		6	6	8	8	8	7
Constructions (*Rationalised*)	4	4		3	3	–	–	–	–
Areas Related to Circles	2	5		–	–	5	4	5	–
Surface Areas and Volumes	8	9		6	6	5	6	5	10
Statistics	7	7		8	8	6	5	6	5
Probability	4	4		–	–	5	6	5	6

**The marks allotment mentioned above is chapter-wise and includes internal choice questions as well. Therefore, the total might not match the Maximum Marks of the respective Previous Year Paper. Here, DL is Delhi, ODL is Outside Delhi.*

Question Typology

YEAR	Objective Questions		Subjective Questions			
	MCQs	A/R	VSA	SA	LA	Case Based type
2024	18	2	5	6	4	3
2023	18	2	5	6	4	3
2022 (Term-II)			6	3	2	2
2022 (Term-I)	40					2
2021	Exam Not Conducted					
2020	20		6	8	6	

Evolving Trends in CBSE Exam Patterns



CONTENTS

MATHEMATICS (Standard) 1 - 216

Upcoming CBSE SQPs/APQs can be accessed through this QR

V. Explanations

CHAPTER-1
REAL NUMBERS

To Access One Shot Revision Video Scan This QR Code

Cheat Sheet

Real Numbers

The Fundamental Theorem of Arithmetic:
- Every composite number can be expressed (factorized) as a product of primes, and this factorisation is unique, apart from the order in which the prime factors occur.

Note: Fundamental theorem of arithmetic is called a Unique Factorisation Theorem.

Composite number = Product of prime numbers.

e.g. $\therefore$ $24 = 2 \times 2 \times 2 \times 3$

$= 2^3 \times 3$, where 2 and 3 are prime numbers

Theorems:
- **Theorem 1:** Let p be a prime number. If p divides a^2, then p divides a, where a is a positive integer.
- **Theorem 2:** $\sqrt{2}$ is an irrational number.

Note: Square root of any prime number is always an irrational number

Irrational Numbers:
It cannot be expressed as $x = \frac{p}{q}$, $q \neq 0$. where p and q are integers.

e.g.: $\sqrt{2}, \sqrt{3}, \pi, \ldots$

Prime Factorisation Method:
Prime Factorisation is a way of representing a number as a product of its prime factors. It is also used to find out the H.C.F and L.C.M.

For any two positive integers a and b we have,

H.C.F $(a, b) \times$ L.C.M $(a, b) = a \times b$

e.g.: Find H.C.F of 24 and 36.

Prime factors of 24 : $2^3 \times 3^1$

Prime factors of 36 : $2^2 \times 3^2$

H.C.F = $2^2 \times 3^1 = 12$

e.g.: Find L.C.M of 12 and 18.

Prime factors of 12 : $2^2 \times 3^1$

Prime factors of 18 : $2^1 \times 3^2$

L.C.M = $2^2 \times 3^2 = 36$

Rational Numbers:
It can be expressed as $x = \frac{p}{q}$, $q \neq 0$. where p and q are integers.

e.g.: $\frac{1}{4}, \frac{2}{3}$, 2, …

Integers 'Z' or 'I':
Integers include all whole numbers and negative numbers.

e.g.: … –3, –2, –1, 0,2,3,.....

Negative Integer:
e.g.: –1, –2, –3, …

Whole Number 'W':
The whole number which includes all the non-negative integers.

W: 0, 1, 2, 3, …

Zero

Natural Number 'N':
Natural numbers are all positive integers

N: 1, 2, 3, …

Prime Number:
Prime numbers are natural numbers that are divisible by only 1 and the number itself. e.g. 2, 3, 5, 7, 11, 13.....

Composite Number:
Composite numbers are numbers that have more than two factors.

e.g. 4, 6, 8, 9, 10, 12....

Co-prime Number:
Co-prime numbers are two pairs of numbers which have a common factor of 1.

e.g. (14,15), (1,99), (8,15)

CHAPTER-4
QUADRATIC EQUATIONS

To Access One Shot Revision Video Scan This QR Code

Cheat Sheet

Factorisation Method:
In this method ($ax^2 + bx + c = 0$) can be expressible as the product of two linear expressions, say ($px + q$) and ($rx + s$), where p, q, r are real numbers such that $p \neq 0, r \neq 0$.

Then $ax^2 + bx + c = 0 \Rightarrow (px + q)(rx + s) = 0$

$(px + q) = 0$ or $(rx + s) = 0 \Rightarrow x = \frac{-q}{p}$ or $x = \frac{-s}{r}$

Quadratic Formula:

For $ax^2 + bx + c = 0$, $D = b^2 - 4ac$,

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

Method of Finding Solution

An equation of the form $ax^2 + bx + c = 0$ where a, b, c are real numbers and $a \neq 0$. is called a quadratic equation in x.

Solution of Roots of Quadratic Equation:

A real number α is called a root of the quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$ if $a\alpha^2 + b\alpha + c = 0$.

Quadratic Equation

Application:

- Speed = $\frac{\text{Distance}}{\text{Time}}$
- Area of figures
- Volume of water = flow rate × time
- Number of ages

Nature of roots:

$ax^2 + bx + c = 0$, $a \neq 0$, where $D = (b^2 - 4ac)$ and the roots are given by $\alpha = \frac{-b + \sqrt{D}}{2a}$ and $\beta = \frac{-b - \sqrt{D}}{2a}$

Case I:

When $D > 0$, roots are real, distinct and given by

$\alpha = \frac{-b + \sqrt{D}}{2a}$ and $\beta = \frac{-b - \sqrt{D}}{2a}$

Case II:

When $D = 0$, roots are real and equal and roots are given by $\alpha = \frac{-b}{2a}$ and $\beta = \frac{-b}{2a}$

Case III:

When $D < 0$, roots are imaginary.

100 MOST PROBABLE QUESTIONS (ANALYZED & SELECTED FROM PYQs)

To Access Detailed Explanations
Scan This QR Code

Note: *Questions in this section are selected based on repetitive themes and concepts from past examinations, though patterns and typologies may vary.*

1. Real Numbers

1. If two positive integers p and q can be expressed as $p = 18\,a^2b^4$ and $q = 20\,a^3b^2$, where a and b are prime numbers, then LCM (p, q) is; **(1 M) (2024)**

(a) $2\,a^2b^2$ (b) $180\,a^2b^2$

(c) $12\,a^2b^2$ (d) $180\,a^3b^4$

2. If the HCF (2520, 6600) = 40 and LCM (2520, 6600) = 252 × k, then the value of k is **(1 M) (2024)**

(a) 1650 (b) 1600

(c) 165 (d) 1625

3. The exponent of 5 in the prime factorisation of 3750 is:

(1 M) (2022 Term-I)

(a) 3 (b) 4 (c) 5 (d) 6

4. Three alarm clocks ring their alarms at regular intervals of 20 min, 25 min and 30 min respectively. If they first beep together at 12 noon, at what time will they beep again for the first time? **(1 M) (2022 Term-I)**

(a) 4:00 pm (b) 4:30 pm

(c) 5:00 pm (d) 5:30 pm

5. Prove that $5-2\sqrt{3}$ is an irrational number. It is given that $\sqrt{3}$ is an irrational number. **(2 M) (2024)**

6. Find the LCM and HCF of 72 and 120. **(2 M) (2023)**

7. Prove that $\sqrt{5}$ is an irrational number. **(3 M) (2024)**

2. Polynomials

8. If α and β are zeroes of the polynomial $2x^2 - 9x + 5$, then value of $\alpha^2 + \beta^2$ is **(1 M) (2024)**

(a) $\frac{1}{4}$ (b) $\frac{61}{4}$ (c) 1 (d) $\frac{71}{4}$

9. If α, β are the zeroes of the polynomial $p(x) = 4x^2 - 3x - 7$, then $\left(\frac{1}{\alpha}+\frac{1}{\beta}\right)$ is equal to: **(1 M) (2023)**

(a) $\frac{7}{3}$ (b) $\frac{-7}{3}$ (c) $\frac{3}{7}$ (d) $\frac{-3}{7}$

10. If one zero of the polynomial $x^2 + 3x + k$ is 2, then the value of k. **(1 M) (2023)**

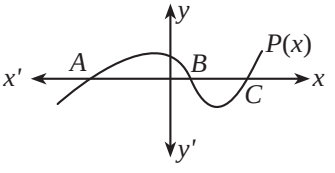
(a) –10 (b) 10 (c) 5 (d) –5

11. If the zeroes of the quadratic polynomial $x^2 + (a + 1)\,x + b$ are 2 and –3, then **(1 M) (2023)**

(a) $a = -7, b = -1$ (b) $a = 5, b = -1$

(c) $a = 2, b = -6$ (d) $a = 0, b = -6$

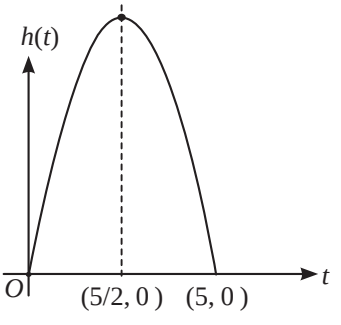
12. In figure, the graph of a polynomial $P(x)$ is shown. The number of zeroes of $P(x)$ is **(1 M) (2022 Term-I)**



(a) 1 (b) 2 (c) 3 (d) 4

13. Find a quadratic polynomial, the sum and product of whose zeroes are 0 and $-\frac{3}{5}$ respectively. Hence find the zeroes. **(3 M) (2016 Term-I)**

14. A ball is thrown in the air so that t seconds after it is thrown, its height H metre above its starting point is given by the polynomial $h = 25t - 5t^2$. **(2024)**



Observe the graph of the polynomial and answer the following questions:

(i) Write zeroes of the given polynomial. **(1 M)**

(ii) Find the maximum height achieved by ball. **(1 M)**

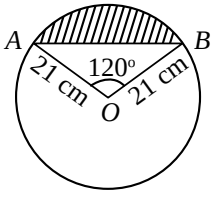
(iii) (a) After throwing upward, how much time did the ball take to reach to the height of 30 m? **(2 M)**

11. Areas Related to Circles

72. The perimeter of a sector of a circle of radius 5.2 cm is 16.4 cm. Find the area of the sector. ***(2 M)*** **(2020)**

73. Find the area of the segment shown in Fig., if radius of the circle is 21 cm and $\angle AOB = 120°$ $\left(\text{Use } \pi = \frac{22}{7}\right)$

(3 M) **(2019)**



74. Find the area of the minor segment of a circle of radius 14 cm, when its central angle is 60°. Also find the area of the corresponding major segment. $\left[\text{Use } \pi = \frac{22}{7}\right]$

(3 M) **(2015 Term-II)**

75. A chord *PQ* of a circle of radius 10 cm subtends an angle of 60° at the centre of circle. Find the area of major and minor segments of the circle. ***(4 M)*** **(2017)**

12. Surface Areas and Volumes

Directions: In Q. No. 76 a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

(*a*) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).

(*b*) Both, Assertion (A) and Reason (R) are true but Reason (R) is not correct explanation for Assertion (A).

(*c*) Assertion (A) is true but Reason (R) is false.

(*d*) Assertion (A) is false but Reason (R) is true.

76. Assertion (A): Two cubes each of edge length 10 cm are joined together. The total surface area of newly formed cuboid is 1200 cm^2.

Reason (R): Area of each surface of a cube of side 10 cm is 100 cm^2. ***(1 M)*** **(2024)**

77. The curved surface area of a right circular cylinder is 176 sq. cm and its volume is 1232 cu. cm. What is the height of the cylinder? ***(2 M)*** **(2022 Term-II)**

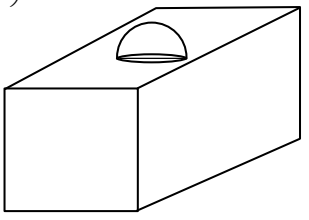
78. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Fig. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. Find the total surface area of the article. ***(3 M)*** **(2018)**

79. A heap of rice is in the form of a cone of base diameter 24 m and height 3.5 m. Find the volume of the rice. How much canvas cloth is required to just cover the heap?

(3 M) **(2018)**

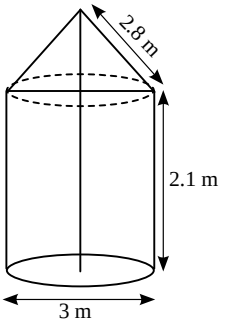
80. From a solid right circular cylinder of height 2.4 cm and radius 0.7 cm, a right circular cone of same height and same radius is cut out. Find the total surface area of the remaining solid. ***(3 M)*** **(2017)**

81. In Fig., is a decorative block, made up of two solids–a cube and a hemisphere. The base of the block is a cube of side 6 cm and the hemisphere fixed on the top has a diameter of 3.5 cm. Find the total surface area of the block. $\left(\text{Use } \pi = \frac{22}{7}\right)$ ***(3 M)*** **(2016 Term-II)**



82. In fig., a tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of ₹ 500 per sq.metre.

(Use $\pi = \frac{22}{7}$) ***(3 M)*** **(2016 Term-II)**



83. A solid wooden toy is in the form of a hemisphere surmounted by a cone of same radius. The radius of hemisphere is 3.5 cm and the total wood used in the making of toy is $166\frac{5}{6}$ cm^3. Find the height of the toy. Also, find the cost of painting the hemispherical part of the toy at the rate of ₹ 10 per cm^2. $\left[\text{Use } \pi = \frac{22}{7}\right]$

(3 M) **(2015 Term-II)**

13. Statistics

84. If value of each observation in a data is increased by 2, then median of the new data ***(1 M)*** **(2024)**

(*a*) increases by 2 (*b*) increases by 2*n*

(*c*) remains same (*d*) decreases by 2

CBSE Solved Paper 2024

In Exam Guru's Ink

Time : 3 hours | Maximum Marks : 80

GENERAL INSTRUCTIONS:

Read the following instructions carefully and follow them:

*(i) This question paper contains **38** questions. **All** questions are **compulsory**.*

*(ii) This question paper is divided into **five** Sections - **A**, **B**, **C**, **D** and **E**.*

*(iii) In **Section A**, Question numbers **1** to **18** are multiple choice questions (MCQs) and question numbers **19** and **20** are Assertion-Reason based questions of **1** mark each.*

*(iv) In **Section B**, Question numbers **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

*(v) In **Section C**, Question numbers **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

*(vi) In **Section D**, Question numbers **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

*(vii) In **Section E**, Question numbers **36** to **38** are **case-study based integrated** questions carrying **4** marks each. Internal choice is provided in **2** marks question in each case-study.*

*(viii) There is no overall choice. However, an internal choice has been provided in **2** questions in Section **B, 2** questions in Section **C, 2** questions in Section **D** and **3** questions of **2** marks in Section **E**.*

(ix) Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.

*(x) Use of calculators is **NOT allowed**.*

SECTION - A

This section consists of 20 questions of 1 mark each.

1. Which term of the A.P. –29, –26, –23,……, 61 is 16? *(1 M)*

(*a*) 11^{th} (*b*) 16^{th} (*c*) 10^{th} (*d*) 31^{st}

1. (b) Given A.P., $-29, -26, -23, \ldots\ldots : 61$

Here, $a = -29$, $d = -26 - (-29) = 3$

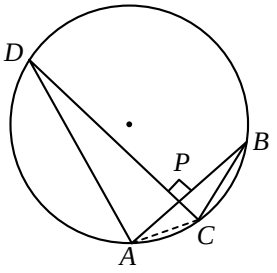
$\because a_n = a + (n-1)d$

$\therefore 16 = -29 + (n-1)3 \Rightarrow 45 = 3n - 3$

$\Rightarrow n = 16$

Hence, 16^{th} term is 16.

4. *AB* and *CD* are two chords of a circle intersecting at *P*. Choose the correct statement from the following: *(1 M)*



(*a*) $\Delta ADP \sim \Delta CBA$ (*b*) $\Delta ADP \sim \Delta BPC$ (*c*) $\Delta ADP \sim \Delta BCP$ (*d*) $\Delta ADP \sim \Delta CBP$

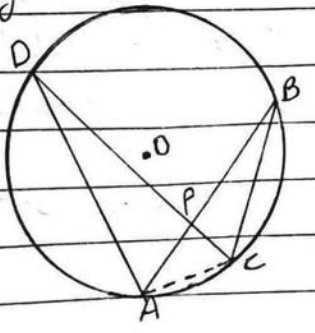
4. (d) In ΔADP & ΔCBP

$\angle DPA = \angle BPC$ (vertically opposite)

$\angle ADP = \angle CBP$ (angles in same segment)

By AA - similarity

$\Delta ADP \sim \Delta CBP$



5. If value of each observation in a data is increased by 2, then median of the new data *(1 M)*

(*a*) increases by 2 (*b*) increases by 2*n* (*c*) remains same (*d*) decreases by 2

5. (a) Since the median is the middle value of the data set when it is arranged in ascending order, increasing every value by the same amount won't change its position relative to other

6. If α and β are zeroes of the polynomial $2x^2 - 9x + 5$, then value of $\alpha^2 + \beta^2$ is *(1 M)*

(*a*) $\frac{1}{4}$ (*b*) $\frac{61}{4}$ (*c*) 1 (*d*) $\frac{71}{4}$

6. (b) $\alpha+\beta = \frac{-b}{a} = \frac{+9}{2}$

$\alpha\beta = \frac{c}{a} = \frac{5}{2}$

CBSE SAMPLE QUESTION PAPER

(Issued by CBSE on 31st March, 2023)

Class-X Session: 2023-24

MATHEMATICS STANDARD (041)

Time : 3 hours | Maximum Marks : 80

GENERAL INSTRUCTIONS:

(i) *This Question Paper has **5** Sections **A**, **B**, **C**, **D** and **E**.*

(ii) ***Section A** has **20** MCQs carrying **01** mark each*

(iii) ***Section B** has **5** questions carrying **02** marks each.*

(iv) ***Section C** has **6** questions carrying **03** marks each.*

(v) ***Section D** has **4** questions carrying **05** marks each.*

(vi) ***Section E** has **3** case based integrated units of assessment (**04** marks each) with subparts of the values of **1**, **1** and **2** marks each respectively.*

(vii) *All Questions are compulsory. However, an internal choice in **2** Questions of **5** marks, **2** Questions of **3** marks and **2** Questions of **2** marks has been provided. An internal choice has been provided in the **2** marks questions of **Section E***

(viii) *Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.*

SECTION - A

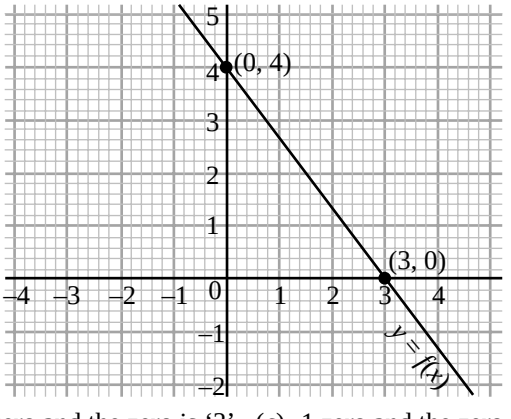
Section A consists of 20 questions of 1 mark each.

1. If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$, where x, y are prime numbers, then the result obtained by dividing the product of the positive integers by the LCM (a, b) is

(a) xy (b) xy^2 (c) x^3y^3 (d) x^2y^2

Sol. (b) xy^2 **(*1 M*)**

2. The given linear polynomial $y = f(x)$ has



(a) 2 zeros (b) 1 zero and the zero is '3' (c) 1 zero and the zero is '4' (d) No zero

Sol. (b) 1 zero and the zero is '3' **(*1 M*)**

Roll No. | | | | | | | | |

Q.P. Code **01**

Candidates must write the Q.P. Code on the title page of the answer book.

SAMPLE QUESTION PAPER- I

MATHEMATICS (STANDARD) - Theory

Time allowed : 3 hours | Maximum Marks : 80

NOTE:

(i) Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

*(ii) Please check that this question paper contains **38** questions.*

*(iii) **Please write down the Serial Number of the question in the answer-book before attempting it.***

(iv) 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

GENERAL INSTRUCTIONS:

Read the following instructions carefully and follow them:

*(i) This question paper contains **38** questions. **All** questions are compulsory.*

*(ii) Question paper is divided into **FIVE** sections – **Section A**, **B**, **C**, **D** and **E**.*

*(iii) In **Section A** – question number **1** to **18** are multiple choice questions (MCQs) and question number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

*(iv) In **Section B** – question number **21** to **25** are Very Short Answer (VSA) type questions of **2** Marks each.*

*(v) In **Section C** – question number **26** to **31** are Short Answer (SA) type questions carrying **3** marks each.*

*(vi) In **Section D** – question number **32** to **35** are Long Answer (LA) type questions carrying **5** marks each.*

*(vii) In **Section E** – question number **36** to **38** are **case based integrated units** of assessment questions carrying **4** marks each. Internal choice is provided in **2** marks question in each case-study.*

*(viii) There is no overall choice. However, an internal choice has been provided in **2** questions in **Section B**, **2** questions in **Section C**, **2** questions in **Section D** and **3** questions in **Section E**.*

(ix) Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

*(x) Use of calculators is **NOT allowed**.*

SECTION - A

Section - A consists of Multiple Choice type questions of 1 mark each.

1. If the zeroes of the quadratic polynomial $ax^2 + bx + c$, $(c \neq 0)$ are equal, then

(*a*) *c* and *b* are have opposite sign. (*b*) *c* and *a* have opposite sign.

(*c*) *c* and *b* have same sign. (*d*) *c* and *a* have same sign.

2. The solution of equations $x - y = 2$ and $x + y = 4$ is:

(*a*) 3 and 1 (*b*) 4 and 3 (*c*) 5 and 1 (*d*) –1 and –3

3. 30^{th} term of the A.P. : 10, 7, 4, … is

(*a*) 97 (*b*) 77 (*c*) –77 (*d*) –87

4. The distance between the points $(m, -n)$ and $(-m, n)$ is

(*a*) $\sqrt{m^2 + n^2}$ (*b*) $m + n$ (*c*) $2\sqrt{m^2 + n^2}$ (*d*) $\sqrt{2m^2 + 2n^2}$

5. The length of the tangent from an external point *A* on a circle with centre *O* is

(*a*) Always greater than *OA*. (*b*) Equal to *OA*. (*c*) Always less than *OA*. (*d*) Cannot be estimated.

6. If $\sin A + \sin^2 A = 1$, then the value of the expression $\cos^2 A + \cos^4 A$ is

(*a*) 1 (*b*) $\frac{1}{2}$ (*c*) 2 (*d*) 3

7. A quadratic polynomial, whose zeroes are –3 and 4, is

(*a*) $x^2 - x + 12$ (*b*) $x^2 + x + 12$ (*c*) $x^2 - x - 12$ (*d*) $2x^2 + 2x - 24$.

8. The value of $\sqrt{6+\sqrt{6+\sqrt{6+\ldots\infty}}}$ is:

(*a*) 4 (*b*) 3 (*c*) 3.5 (*d*) –3

9. Which term of the sequence 4, 9, 14, 19,....124?

(*a*) 15 (*b*) 20 (*c*) 25 (*d*) 30

10. The mode and mean is given by 7 and 8 respectively. The median is:

(*a*) $\frac{1}{13}$ (*b*) $\frac{13}{3}$ (*c*) $\frac{23}{3}$ (*d*) 33

11. The value(s) of *k* for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is

(*a*) 4 (*b*) ±4 (*c*) –4 (*d*) 0

12. The area of a sector of a circle with radius 6 cm if angle of the sector is 60°, is

(*a*) $\frac{132}{7}$ cm^2 (*b*) $\frac{142}{7}$ cm^2 (*c*) $\frac{152}{7}$ cm^2 (*d*) $\frac{122}{7}$ cm^2

13. The numbers of multiples of 4 between 10 and 250 is

(*a*) 50 (*b*) 40 (*c*) 60 (*d*) 30

14. The probability that a non-leap year selected at random will contain 53 sundays is:

(*a*) $\frac{1}{7}$ (*b*) $\frac{2}{7}$ (*c*) $\frac{3}{7}$ (*d*) $\frac{5}{7}$

15. The pair of equations $x + 2y + 5 = 0$ and $-3x - 6y + 1 = 0$ have

(*a*) A unique solution (*b*) Exactly two solution (*c*) Infinitely many solution (*d*) No solution

16. There are two cylinders of radius '*R*' and '*r*' and having the same height. Find the ratio of their lateral surface areas.

(*a*) 2 : 3 (*b*) *H* : *h* (*c*) *R* : *r* (*d*) None of these

17. A ladder makes an angle of 60° with the ground, when placed along a wall. If the foot of ladder is 8 m away from the wall, the length of ladder is

(*a*) 4 m (*b*) 8 m (*c*) $8\sqrt{3}$ m (*d*) 16 m

SAMPLE QUESTION PAPER-I

(Explanations)

1. (*d*) We know, for equal roots, discriminant will be equal to zero.

$\therefore \quad D = 0$

$\Rightarrow \quad b^2 - 4ac = 0 \Rightarrow b^2 = 4ac \Rightarrow ac = b^2/4 \Rightarrow ac > 0$

Hence, it is only possible when both a and c have same sign. **(1 M)**

2. (*a*) Given: $x - y = 2$ ...(*i*)

$x + y = 4$ ...(*ii*)

Adding eqn. (*i*) and (*ii*), we get $2x = 6 \Rightarrow x = 3$

Put the value of x in equation (*i*), we get

$3 - y = 2 \Rightarrow y = 1$

Hence, $x = 3, y = 1$ **(1 M)**

3. (*c*) Given: $a = 10, n = 30$

$d = 7 - 10 = -3$

We know $a_n = a + (n - 1)\, d$

$\therefore \quad a_{30} = 10 + (30 - 1)(-3) = -77$ **(1 M)**

4. (*c*) Given points are $(m, -n)$ and $(-m, n)$

Let, $x_1 = m, y_1 = -n$

$x_2 = -m, y_2 = n$

Distance between A and B

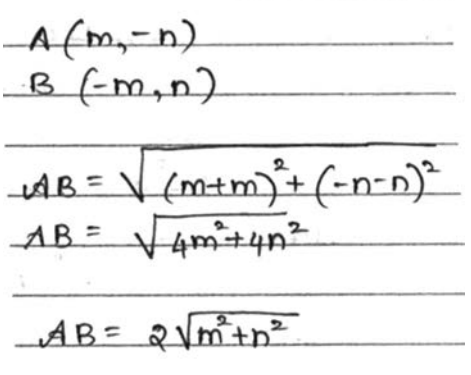
$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$ **(½ M)**

$$\Rightarrow \quad AB = \sqrt{(-m - m)^2 + (n - (-n))^2}$$

$$\Rightarrow \quad AB = \sqrt{(-2m)^2 + (2n)^2}$$

$$\Rightarrow \quad AB = 2\sqrt{m^2 + n^2}$$ **(½ M)**

Topper's Explanation ***(CBSE 2020)***



Mistakes 101 : What not to do!

In this type of problem, students often mistakenly enter incorrect coordinates into the formula.

5. (*c*) We know, The tangent is perpendicular to the radius of the circle, then angle between them is 90°.

Thus OA is hypotenuse for the right triangle OAB, which is right – angled at B.

For any right triangle, the hypotenuse is the longest side.

The length of the tangent from an external point is always less than the OA. **(1 M)**

6. (*a*) Given, $\sin A + \sin^2 A = 1$

$\sin A = 1 - \sin^2 A = \cos^2 A \quad [\because \ \sin^2\theta + \cos^2\theta = 1]$

On squaring both sides, we get

$\sin^2 A = \cos^4 A \Rightarrow 1 - \cos^2 A = \cos^4 A$

$\Rightarrow \quad \cos^2 A + \cos^4 A = 1$ **(1 M)**

7. (*c*) Given, zeroes are $\alpha = -3$ and $\beta = 4$

Sum of roots $= \alpha + \beta = -3 + 4 = 1$

Product of root $= \alpha\beta = -3 \times 4 = -12$

Now, quadratic polynomial $f(x) = x^2 -$ (Sum of roots) $x +$ product of roots

$\Rightarrow \quad f(x) = x^2 - x - 12$ **(1 M)**

8. (*b*) Let, $\sqrt{6 + \sqrt{6 + \sqrt{6 + \cdots}}} = x$

$\therefore \quad \sqrt{6 + x} = x$

On squaring both sides, we get

$6 + x = x^2 \Rightarrow x^2 - x - 6 = 0$

$\Rightarrow \quad (x - 3)(x + 2) = 0 \Rightarrow x = -2, 3$

Since, x cannot be negative therefore $x = 3$. **(1 M)**

9. (*c*) The given sequence is an A.P. with first term $(a) = 4$ and common difference $(d) = 5$.

Let n^{th} term of an A.P. be = 124

$\therefore \quad a_n = 124 \Rightarrow a + (n - 1)d = 124$

$\Rightarrow \quad 4 + (n - 1) \times 5 = 124 \Rightarrow n = 25$

Therefore, 124 is the 25^{th} term of the given sequence. **(1 M)**

10. (*c*) Given: mode = 7 and mean = 8

we know, 3 Median = Mode + 2 Mean = $7 + 2 \times 8$

$\therefore \quad$ Median $= \dfrac{23}{3}$ **(1 M)**

11. (*b*) Given that quadratic equation $2x^2 + kx + 2=0$ has equal roots.

By comparing with the quadratic equation $x^2 + bx + c = 0$, we get $a = 2$, $b = k$ and $c = 2$.

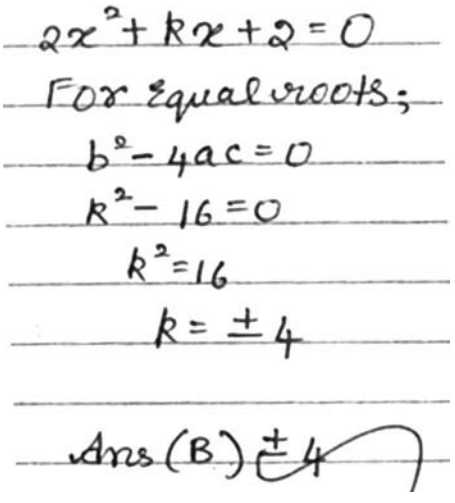
We know that the quadratic equation $ax^2 + bx + c = 0$ has equal roots, if $b^2 - 4ac = 0$.

Therefore, $k^2 - 4 \times 2 \times 2 = 0$

$\Rightarrow \quad k^2 = 4^2 = 16$

$\Rightarrow \quad k = \pm 4$. **(1 M)**

Topper's Explanation ***(CBSE 2020)***



Mistakes 101 : What not to do!

In questions involving quadratic equations, students often make mistakes when looking at the coefficients of x^2 and x.

12. (*a*) Given, $\theta = 60°$, Radius (r) = 6 cm

Area of the sector = $\left(\frac{\theta}{360°}\right) \times \pi r^2$

$= \frac{60°}{360°} \times \frac{22}{7} \times 6 \times 6 = \frac{132}{7}$ cm^2 **(1 M)**

13. (*c*) Multiple of 4 after 10 are:

12, 16, 20, 24, …248

$a = 12$, $d = 4$, $a_n = 248$

we know, $a_n = a + (n - 1)d$

$\Rightarrow \quad 248 = 12 + (n - 1)4 \Rightarrow 236 = (n - 1)4$

$\Rightarrow \quad n = 60$ **(1 M)**

14. (*a*) No. of days in a non-leap year = 365 days

365 days = 52 weeks + 1 day

For 52 weeks, no. of Sunday = 52

1 remaining day can be Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday.

Total number of possible outcomes = 7, number of favourable outcomes = 1

$$\text{Probability} = \frac{\text{Number of favourable outcomes}}{\text{Total number of possible outcomes}}$$

$$= \frac{1}{7}$$ **(1 M)**

15. (*d*) Given: pair of equation $x + 2y + 5 = 0$ and $-3x - 6y + 1 = 0$

Comparing pair of equation with $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, we get

Now, $a_1 = 1$, $a_2 = -3$, $b_1 = 2$, $b_2 = -6$, $c_1 = 5$ $c_2 = 1$

$$\frac{a_1}{a_2} = \frac{1}{-3}, \frac{b_1}{b_2} = \frac{1}{-3}, \frac{c_1}{c_2} = \frac{5}{1}$$

$$\Rightarrow \quad \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$ **(1 M)**

Hence, no solution.

16. (*c*) Given, h is the height of both cylinders.

Let R be the radius of 1st cylinder and r be the radius of 2nd cylinder.

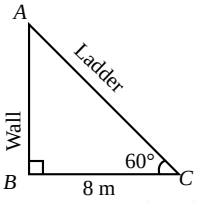
$$\frac{(\text{C.S.A})_1}{(\text{C.S.A})_2} = \frac{2\pi Rh}{2\pi rh} = \frac{R}{r} = R : r$$ **(1 M)**

17. (*d*) Let AB be the wall, AC be the length of the ladder.

In ΔABC,

$\cos 60° = \frac{BC}{AC}$

$\frac{1}{2} = \frac{8}{AC} \Rightarrow AC = 16$ m. **(1 M)**



Nailing the Right Answer

Students should create a right triangle and then use trigonometric ratios like sine and cosine to figure out values that are missing.

18. (*b*) The given equation is $2x^2 + kx + 3 = 0$

Comparing the given equation with $ax^2 + bx + c = 0$ we get $a = 2$, $b = k$, $c = 3$

We know, Discriminant $D = b^2 - 4ac$

$= k^2 - 4\,(2)\,(3) = k^2 - 24$

For equal roots, $D = 0 \Rightarrow k^2 - 24 = 0$

$\Rightarrow k^2 = 24 \Rightarrow k = \pm\sqrt{24} = \pm 2\sqrt{6}$

Therefore, if this equation has two equal roots, k should be $+2\sqrt{6}$ and $-2\sqrt{6}$. **(1 M)**

19. (*d*) Here reason is true (Standard result). Assertion is false.

We know that, for any two numbers, product of the two numbers = HCF × LCM = 18 × 169

$= 3042 \neq 3072$ **(1 M)**

How to Use This Book: A Simplified Guide

1 Step

Gain a deep understanding of the most current exam trends through CBSE's Past 5 Years' Paper Trend Analysis and Evolving Trends in CBSE Exam Patterns.

2 Step

Scan the provided QR code to access lecture videos. These will help you understand the core concepts of each chapter

3 Step

Use the 'Cheat Sheets' for each chapter to refresh and reinforce your understanding.

4 Step

Study the CBSE Past Year Paper 2024 and CBSE SQP. Understand the exam's structure, types of questions, marks distribution, word limits, and marking criteria.

5 Step

Select the Sample Question Paper and solve it in a setting that mimics the actual exam environment.

6 Step

Solve sample papers of varying difficulty levels - easy, medium, and hard. This ensures a well-rounded preparation.

7 Step

After attempting each paper, use the self-assessment sheet to grade yourself and understand your performance.

8 Step

Compare your answers with the explanations provided in the book. Pay special attention to sections like "Mistakes 101", "Nailing the Right Answers", and "Topper's Explanations" to learn from common mistakes and understand the best ways to answer questions.

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