

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2024
MATHEMATICS PAPER CODE 30/4/3

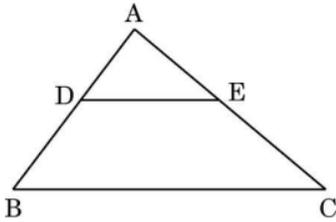
General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. It’s leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc. may invite action under various rules of the Board and IPC.”
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class - X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded.
4	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark (✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written on the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded on the left-hand margin and encircled. This may also be followed strictly.

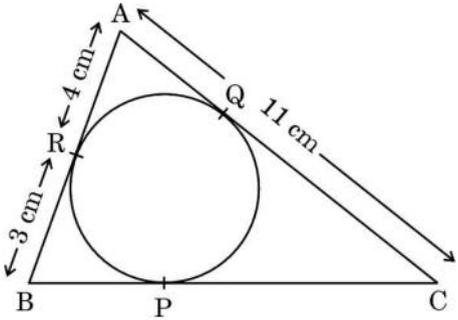
9	<u>In Q1-Q20, if a candidate attempts the question more than once (without cancelling the previous attempt), marks shall be awarded for the first attempt only and the other answer scored out with a note “Extra Question”.</u>
10	<u>In Q21-Q38, if a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “Extra Question”.</u>
11	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
12	A full scale of marks _____ (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
13	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
14	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- <ul style="list-style-type: none"> ● Leaving answer or part thereof unassessed in an answer book. ● Giving more marks for an answer than assigned to it. ● Wrong totalling of marks awarded to an answer. ● Wrong transfer of marks from the inside pages of the answer book to the title page. ● Wrong question wise totalling on the title page. ● Wrong totalling of marks of the two columns on the title page. ● Wrong grand total. ● Marks in words and figures not tallying/not same. ● Wrong transfer of marks from the answer book to online award list. ● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) ● Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
15	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
16	Any un assessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
17	The Examiners should acquaint themselves with the guidelines given in the “ Guidelines for spot Evaluation ” before starting the actual evaluation.
18	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.
19	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

MARKING SCHEME
MATHEMATICS (Subject Code–041)
(PAPER CODE: 30/4/3)

Q. No.	EXPECTED OUTCOMES/VALUE POINTS	Marks
	SECTION A This section comprises Multiple Choice Questions (MCQs) of 1 mark each	
1.	The area of the sector of a circle of radius 12 cm is $60\pi \text{ cm}^2$. The central angle of this sector is : (A) 120° (B) 6° (C) 75° (D) 150°	
Sol.	(D) 150°	1
2.	Two lines are given to be parallel. The equation of one of these lines is $5x - 3y = 2$. The equation of the second line can be : (A) $-15x - 9y = 5$ (B) $15x + 9y = 5$ (C) $9x - 15y = 6$ (D) $-15x + 9y = 5$	
Sol.	(D) $-15x + 9y = 5$	1
3.	At some time of the day, the length of the shadow of a tower is equal to its height. Then, the Sun's altitude at that time is : (A) 30° (B) 45° (C) 60° (D) 90°	
Sol.	(B) 45°	1
4.	The pair of linear equations $y = 0$ and $y = -7$ have (A) exactly one solution (B) two solutions (C) infinitely many solutions (D) no solution	
Sol.	(D) no solution	1
5.	The area of the square inscribed in a circle of radius $5\sqrt{2}$ cm is : (A) 50 cm^2 (B) 100 cm^2 (C) 25 cm^2 (D) 200 cm^2	
Sol.	(B) 100 cm^2	1

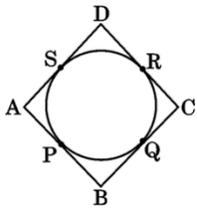
9.	<p>The HCF of two numbers 65 and 104 is 13. If LCM of 65 and 104 is $40x$, then the value of x is :</p> <p>(A) 5 (B) 13 (C) 40 (D) 8</p>	
Sol.	(B) 13	1
10.	<p>For an event E, if $P(E) + P(\bar{E}) = q$, then the value of $q^2 - 4$ is :</p> <p>(A) -3 (B) 3 (C) 5 (D) -5</p>	
Sol.	(A) -3	1
11.	<p>In ΔABC, $DE \parallel BC$ (as shown in the figure). If $AD = 4$ cm, $AB = 9$ cm and $AC = 13.5$ cm, then the length of EC is :</p>  <p>(A) 6 cm (B) 7.5 cm (C) 9 cm (D) 5.7 cm</p>	
Sol.	(B) 7.5 cm	1
12.	<p>If a polynomial $p(x)$ is given by $p(x) = x^2 - 5x + 6$, then the value of $p(1) + p(4)$ is :</p> <p>(A) 0 (B) 4 (C) 2 (D) -4</p>	
Sol.	(B) 4	1
13.	<p>The fourth vertex D of a parallelogram $ABCD$ whose three vertices are $A(-2, 3)$, $B(6, 7)$ and $C(8, 3)$ is :</p> <p>(A) (0, 1) (B) (0, -1) (C) (-1, 0) (D) (1, 0)</p>	
Sol.	(B) (0,-1)	1

14.	<p>If the difference of mode and median of a data is 24, then the difference of its median and mean is :</p> <p>(A) 12 (B) 24 (C) 8 (D) 36</p>	
Sol.	(A) 12	1
15.	<p>Three numbers in A.P. have the sum 30. What is its middle term ?</p> <p>(A) 4 (B) 10 (C) 16 (D) 8</p>	
Sol.	(B) 10	1
16.	<p>The probability of throwing a number greater than 2 with a fair die is :</p> <p>(A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{5}{6}$</p>	
Sol.	(A) $\frac{2}{3}$	1
17.	<p>If $y = 1$ is one of the solutions of the quadratic equation $py^2 + py + 3 = 0$, then the value of p is :</p> <p>(A) -3 (B) 2 (C) $-\frac{3}{2}$ (D) -2</p>	
Sol.	(C) $-\frac{3}{2}$	1
18.	<p>The value of θ for which $2 \sin^2 \theta = \frac{1}{2}$; $0^\circ \leq \theta \leq 90^\circ$ is :</p> <p>(A) 30° (B) 60° (C) 45° (D) 90°</p>	
Sol.	(A) 30°	1

	<p><i>Questions number 19 and 20 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.</i></p> <p>(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).</p> <p>(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).</p> <p>(C) Assertion (A) is true, but Reason (R) is false.</p> <p>(D) Assertion (A) is false, but Reason (R) is true.</p>	
19.	<p><i>Assertion (A) :</i> Mid-point of a line segment divides the line segment in the ratio 1 : 1.</p> <p><i>Reason (R) :</i> The ratio in which the point (- 3, k) divides the line segment joining the points (- 5, 4) and (- 2, 3) is 1 : 2.</p>	
Sol.	(C) Assertion (A) is true but Reason (R) is false	1
20.	<p><i>Assertion (A) :</i> If the circumference of a circle is 176 cm, then its radius is 28 cm.</p> <p><i>Reason (R) :</i> Circumference = $2\pi \times$ radius of a circle.</p>	
Sol.	(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).	1
SECTION B		
This section comprises Very Short Answer (VSA) type questions of 2 marks each.		
21.	<p>In the given figure, ΔABC is circumscribing a circle. Find the length of BC, if AR = 4 cm, BR = 3 cm and AC = 11 cm.</p> 	
Sol.	BP = BR = 3 cm and AQ = AR = 4 cm	$\frac{1}{2}$

	$QC = AC - AQ = 11 - 4 = 7 \text{ cm}$ $PC = QC = 7 \text{ cm}$ $\therefore BC = BP + PC = 3 + 7 = 10 \text{ cm}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
22. (a)	Evaluate : $\frac{5 \cos^2 60^\circ + 4 \sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \sin^2 60^\circ}$	
Sol.	$\frac{5\left(\frac{1}{2}\right)^2 + 4\left(\frac{2}{\sqrt{3}}\right)^2 - (1)^2}{\left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2}$ $= \frac{67}{12}$	$1\frac{1}{2}$ $\frac{1}{2}$
OR		
22. (b)	If $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$; $0 < A + B \leq 90^\circ$, $A > B$; find $\angle A$ and $\angle B$.	
Sol.	$\sin(A - B) = \sin 30^\circ$ $A - B = 30^\circ$ -----(i) $\cos(A+B) = \cos 60^\circ$ $A + B = 60^\circ$ -----(ii) Solving (i) and (ii) $A = 45^\circ$, $B = 15^\circ$	$\frac{1}{2}$ $\frac{1}{2}$ 1
23.	<p>In the given figure, $\Delta AHK \sim \Delta ABC$. If $AK = 8 \text{ cm}$, $BC = 3.2 \text{ cm}$ and $HK = 6.4 \text{ cm}$, then find the length of AC.</p>	
Sol.	$\because \Delta AHK \sim \Delta ABC$ (given) $\therefore \frac{HK}{BC} = \frac{AK}{AC}$	

	$\Rightarrow \frac{6.4}{3.2} = \frac{8.0}{AC}$ $\Rightarrow AC = 4 \text{ cm}$	1 1
24.(a)	The minute hand of a clock is 14 cm long. Find the area on the face of the clock described by the minute hand in 5 minutes.	
Sol.	Angle subtended in 5 min. = 30° Area described by minute hand = $\frac{30}{360} \times \frac{22}{7} \times 14 \times 14$ $= \frac{154}{3} \text{ cm}^2$ or 51.33 cm^2 approx.	$\frac{1}{2}$ 1 $\frac{1}{2}$
	OR	
24.(b)	Find the length of the arc of a circle which subtends an angle of 60° at the centre of the circle of radius 42 cm.	
Sol.	Length of arc = $2 \times \frac{22}{7} \times 42 \times \frac{60}{360}$ $= 44 \text{ cm}$	$1\frac{1}{2}$ $\frac{1}{2}$
25.	Three bells toll at intervals of 9, 12 and 15 minutes respectively. If they start tolling together, after what time will they next toll together ?	
Sol.	$9 = 3^2$ $12 = 2^2 \times 3$ $15 = 3 \times 5$ L.C.M = $2^2 \times 3^2 \times 5 = 180$ Three bells will toll together after 180 min.	} 1 1
	SECTION C	
	This section comprises of Short Answer (SA) type questions of 3 marks each.	
26.(a)	Three coins are tossed simultaneously. What is the probability of getting (i) at least one head ? (ii) exactly two tails ? (iii) at most one tail ?	
Sol.	Total number of outcomes = 8	

	(i) $P(\text{at least one head}) = \frac{7}{8}$	1
	(ii) $P(\text{exactly 2 tails}) = \frac{3}{8}$	1
	(iii) $P(\text{at most one tail}) = \frac{4}{8} \text{ or } \frac{1}{2}$	1
	OR	
26.(b)	A box contains 90 discs which are numbered 1 to 90. If one disc is drawn at random from the box, find the probability that it bears a : (i) 2-digit number less than 40. (ii) number divisible by 5 and greater than 50. (iii) a perfect square number.	
Sol.	Total outcomes = 90 (i) $P(\text{2 digit number less than 40}) = \frac{30}{90} \text{ or } \frac{1}{3}$ (ii) $P(\text{a number divisible by 5 and greater than 50}) = \frac{8}{90} \text{ or } \frac{4}{45}$ (iii) $P(\text{a perfect square number}) = \frac{9}{90} \text{ or } \frac{1}{10}$	1 1 1
27.	Prove that the parallelogram circumscribing a circle is a rhombus.	
Sol.	Correct figure	$\frac{1}{2}$
		
	$AP = AS$ -----(i) $BP = BQ$ -----(ii) $CR = CQ$ -----(iii) $DR = DS$ -----(iv) Adding (i), (ii), (iii) & (iv) $AP + BP + CR + DR = AS + BQ + CQ + DS$	} 1

	Hence $\frac{2-\sqrt{3}}{5}$ is an irrational number.	1/2
30.	A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 20 days, she has to pay ₹ 1,500 as hostel charges while another student B, who takes food for 26 days, pays ₹ 1,800. Find the fixed charges and the cost of food.	
Sol.	<p>Let the monthly fixed charges of hostel be ₹ x and cost of food be ₹ y per day.</p> <p>A.T.Q</p> $x + 20y = 1500 \quad \text{-----(i)}$ $x + 26y = 1800 \quad \text{-----(ii)}$ <p>Solving equations (i) & (ii)</p> $x = 500, y = 50$ <p>Hence, the monthly fixed charges of hostel be ₹ 500 and cost of food be ₹ 50 per day.</p>	<p>1</p> <p>1</p> <p>1/2 + 1/2</p>
31.	Prove that $\sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta} = \tan \theta + \cot \theta$.	
Sol.	$\begin{aligned} \text{L.H.S} &= \sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta} \\ &= \sqrt{1 + \tan^2 \theta + 1 + \cot^2 \theta} \\ &= \sqrt{(\tan \theta + \cot \theta)^2} \\ &= \tan \theta + \cot \theta \\ &= \text{R.H.S} \end{aligned}$	<p>1</p> <p>1</p> <p>1</p>

SECTION D

This section comprises Long Answer (LA) type questions of 5 marks each.

32.

The following distribution shows the daily pocket allowance of children of a locality. The mean daily pocket allowance is ₹ 36.10. Find the missing frequency, f .

Daily pocket allowance (in ₹)	20 – 25	25 – 30	30 – 35	35 – 40	40 – 45	45 – 50	50 – 55
Number of children	7	6	9	13	f	5	4

Sol.

Daily pocket allowance (in ₹)	Number of children (f_i)	x_i	$x_i f_i$
20 – 25	7	22.5	157.5
25 – 30	6	27.5	165
30 – 35	9	32.5	292.5
35 – 40	13	37.5	487.5
40 – 45	f	42.5	42.5 f
45 – 50	5	47.5	237.5
50 – 55	4	52.5	210.0
Total	44 + f		1550 + 42.5 f

Correct table

$$\text{Mean} = 36.10$$

$$\frac{1550 + 42.5f}{44 + f} = 36.10$$

$$\Rightarrow f = 6$$

2

2

1

33.(a)

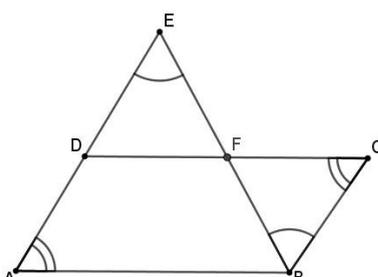
A train travels a distance of 90 km at a constant speed. Had the speed been 15 km/h more, it would have taken 30 minutes less for the journey. Find the original speed of the train.

Sol.

Let the original speed be x km/h

New speed = $(x + 15)$ km/h

 $\frac{1}{2}$

	<p>A.T.Q.</p> $\frac{90}{x} - \frac{90}{x+15} = \frac{1}{2}$ $\Rightarrow x^2 + 15x - 2700 = 0$ $\Rightarrow (x + 60)(x - 45) = 0$ $x \neq -60 \text{ So, } x = 45$ <p>The original speed of the train = 45 km/h</p>	<p>1½</p> <p>1</p> <p>1</p> <p>1</p>
	OR	
33.(b)	<p>Find the value of 'c' for which the quadratic equation</p> $(c + 1)x^2 - 6(c + 1)x + 3(c + 9) = 0; c \neq -1$ <p>has real and equal roots.</p>	
Sol.	<p>For real and equal roots,</p> $\{-6(c + 1)\}^2 - 4(c + 1) \times 3(c + 9) = 0$ $\Rightarrow 12(c + 1)(2c - 6) = 0$ $c \neq -1 \text{ So, } c = 3$	<p>2</p> <p>2</p> <p>1</p>
34(a).	<p>E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$.</p>	
Sol.	<div style="text-align: right;">Correct figure</div>  <p>In ΔABE and ΔCFB</p> $\angle EAB = \angle BCF$ $\angle AEB = \angle CFB$ $\Rightarrow \Delta ABE \sim \Delta CFB$	<p>2</p> <p>1</p> <p>1</p> <p>1</p>

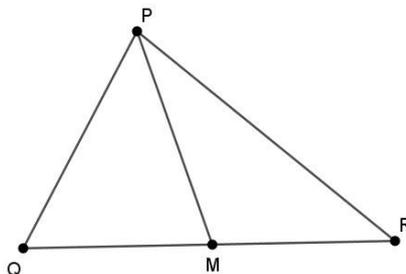
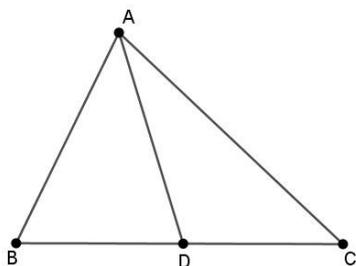
OR

34(b).

Sides AB, BC and the median AD of ΔABC are respectively proportional to sides PQ, QR and the median PM of another ΔPQR . Prove that $\Delta ABC \sim \Delta PQR$.

Sol.

Correct figure



$$\therefore \frac{AB}{PQ} = \frac{BC}{QR} = \frac{AD}{PM}$$

$$\therefore \frac{AB}{PQ} = \frac{2BD}{2QM} = \frac{AD}{PM}$$

$$\Rightarrow \frac{AB}{PQ} = \frac{BD}{QM} = \frac{AD}{PM} \text{ -----(i)}$$

$$\Rightarrow \Delta ABD \sim \Delta PQM$$

$$\Rightarrow \angle B = \angle Q \text{ -----(ii)}$$

In ΔABC and ΔPQR

$$\frac{AB}{PQ} = \frac{BC}{QR}$$

$$\angle B = \angle Q$$

$$\therefore \Delta ABC \sim \Delta PQR$$

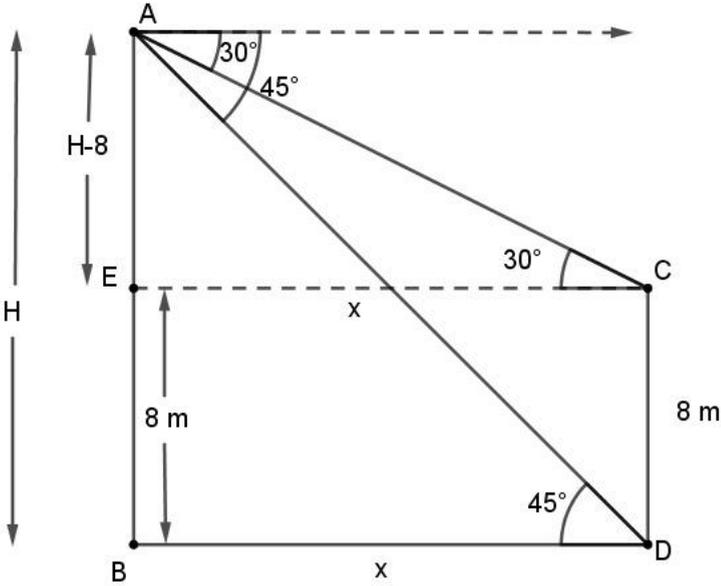
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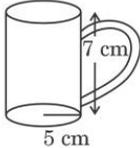
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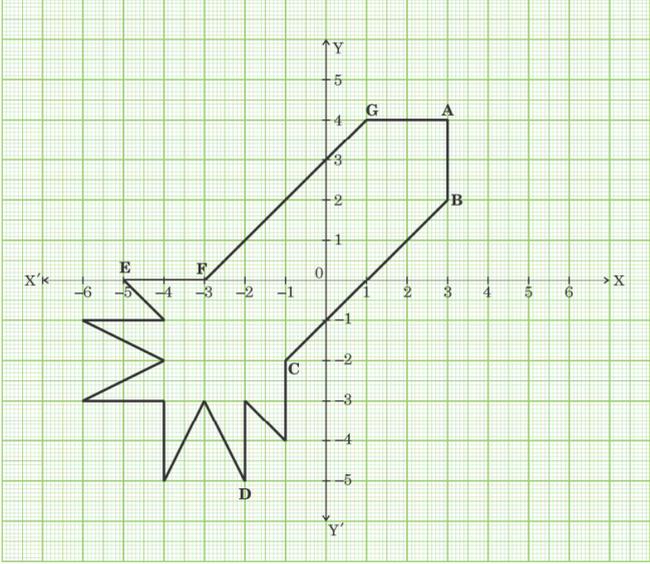
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35.	<p>The angles of depression of the top and the bottom of a 8 m tall building from the top of a multi-storeyed building are 30° and 45° respectively. Find the height of the multi-storeyed building and the distance between the two buildings.</p>	
Sol.	<p style="text-align: right;">Correct figure</p>  <p>Let height of multi storeyed building AB be H m and CD is a tall building. Let the distance between the two buildings be X m.</p> <p>In $\triangle ABD$</p> $\tan 45^\circ = 1 = \frac{H}{X}$ $\Rightarrow H = X \text{ -----(i)}$ <p>In $\triangle AEC$</p> $\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{H-8}{X}$ $\Rightarrow X = \sqrt{3} (H - 8) \text{ -----(ii)}$ <p>Solving equations (i) & (ii)</p> $X = 4 (3 + \sqrt{3})$	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1/2</p>

	<p>and $H = 4(3 + \sqrt{3})$</p> <p>The height of the multi storeyed building is $4(3 + \sqrt{3})$ m and the distance between the two buildings is $4(3 + \sqrt{3})$ m.</p>	$\frac{1}{2}$
	<p>SECTION E</p> <p>This section comprises 3 case-study based questions of 4 marks each.</p>	
36.	<p style="text-align: center;">Case Study - 1</p> <p>Treasure Hunt is an exciting and adventurous game where participants follow a series of clues/numbers/maps to discover hidden treasures. Players engage in a thrilling quest, solving puzzles and riddles to unveil the location of the coveted prize.</p> <p>While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forming an A.P. If the number on the n^{th} spot is $20 + 4n$, then answer the following questions to help the players in spotting the clues :</p> <div style="text-align: center;">  </div> <p>(i) Which number is on first spot ?</p> <p>(ii) (a) Which spot is numbered as 112 ?</p> <p style="text-align: center;">OR</p> <p>(b) What is the sum of all the numbers on the first 10 spots ?</p> <p>(iii) Which number is on the $(n - 2)^{\text{th}}$ spot ?</p>	
Sol.	<p>(i) Number on the first spot = $20 + 4 \times 1 = 24$</p> <p>(ii) (a) $20 + 4n = 112$ $\Rightarrow n = 23$</p>	<p>1</p> <p>1</p> <p>1</p>

	<p style="text-align: center;">OR</p> <p>(ii) (b) $d = 4$</p> $S_{10} = \frac{10}{2} [2 \times 24 + 9 \times 4]$ $= 420$ <p>(iii) Number on the $(n - 2)^{\text{th}}$ spot $= 20 + 4(n - 2)$</p> $= 12 + 4n$	<p style="text-align: center;">$\frac{1}{2}$</p> <p style="text-align: center;">1</p> <p style="text-align: center;">$\frac{1}{2}$</p> <p style="text-align: center;">1</p>
37.	<p style="text-align: center;">Case Study - 2</p> <p>Tamper-proof tetra-packed milk guarantees both freshness and security. This milk ensures uncompromised quality, preserving the nutritional values within and making it a reliable choice for health-conscious individuals.</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="text-align: center; margin: 10px 0;">  </div> <p>500 mL milk is packed in a cuboidal container of dimensions $15 \text{ cm} \times 8 \text{ cm} \times 5 \text{ cm}$. These milk packets are then packed in cuboidal cartons of dimensions $30 \text{ cm} \times 32 \text{ cm} \times 15 \text{ cm}$.</p> <p>Based on the above given information, answer the following questions :</p> <p>(i) Find the volume of the cuboidal carton.</p> <p>(ii) (a) Find the total surface area of a milk packet.</p> <p style="text-align: center;">OR</p> <p>(b) How many milk packets can be filled in a carton ?</p> <p>(iii) How much milk can the cup (as shown in the figure) hold ?</p>	
Sol.	<p>(i) Volume of cuboidal carton $= 30 \times 32 \times 15$</p> $= 14400 \text{ cm}^3$	<p style="text-align: center;">$\frac{1}{2}$</p> <p style="text-align: center;">$\frac{1}{2}$</p>

	<p>(ii)(a) Total surface area of milk packet = $2(15 \times 8 + 8 \times 5 + 5 \times 15)$ $= 470 \text{ cm}^2$</p> <p style="text-align: center;">OR</p> <p>(ii) (b) Number of milk packets in carton = $\frac{30 \times 32 \times 15}{15 \times 8 \times 5}$ $= 24$</p> <p>(iii) Capacity of the cup = $\frac{22}{7} \times 5 \times 5 \times 7$ $= 550 \text{ cm}^3$ or 550 ml</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>
38.	<p style="text-align: center;">Case Study - 3</p> <p>Ryan, from a very young age, was fascinated by the twinkling of stars and the vastness of space. He always dreamt of becoming an astronaut one day. So he started to sketch his own rocket designs on the graph sheet. One such design is given below :</p> <div style="text-align: center;">  </div> <p>Based on the above, answer the following questions :</p> <p>(i) Find the mid-point of the segment joining F and G.</p> <p>(ii) (a) What is the distance between the points A and C ?</p> <p style="text-align: center;">OR</p> <p>(b) Find the coordinates of the point which divides the line segment joining the points A and B in the ratio 1 : 3 internally.</p> <p>(iii) What are the coordinates of the point D ?</p>	
Sol.	<p>(i) Mid point of FG is $\left(\frac{-3+1}{2}, \frac{0+4}{2}\right) = (-1, 2)$</p>	1

	<p>(ii) (a) $AC = \sqrt{(-1 - 3)^2 + (-2 - 4)^2}$ $= \sqrt{52}$ or $2\sqrt{13}$</p> <p style="text-align: center;">OR</p> <p>(ii) (b) The coordinates of required point are $\left(\frac{1 \times 3 + 3 \times 3}{1 + 3}, \frac{1 \times 2 + 3 \times 4}{1 + 3}\right)$ i.e. $\left(3, \frac{7}{2}\right)$</p> <p>(iii) D(-2, -5)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
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