Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2026
MATHEMATICS (STANDARD) (041) (PAPER CODE 30/2/3)

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 BNS."**
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 the 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.

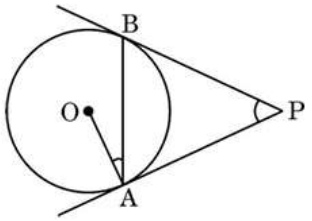
9.	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note **"Extra Question"**.
10.	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11.	A full scale of marks 0 to 80 (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.
12.	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.
13.	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- ● 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.
14.	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.
15.	Any unassessed 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.
16.	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for spot Evaluation**" before starting the actual evaluation.
17.	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.
18.	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.

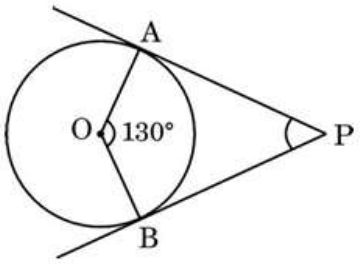
MARKING SCHEME

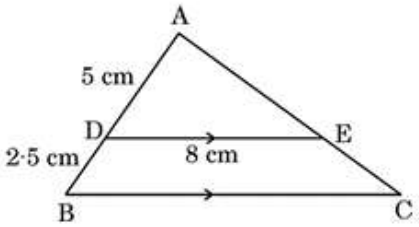
MATHEMATICS (Subject Code–041)

(PAPER CODE: 30/2/3)

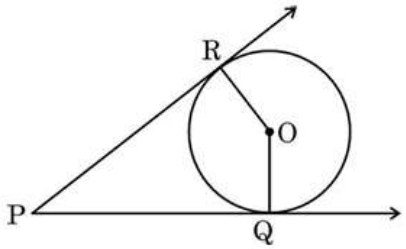
Q. No.	EXPECTED OUTCOMES/VALUE POINTS	Step	Marks
	SECTION A This section has **20** Multiple Choice Questions (MCQs) carrying 1 mark each.		
1.	The distance of the point A(4a, 3a) from x-axis is : (A) 3a (B) – 3a (C) 4a (D) – 4a		
Sol.	(A) 3a		**1**
2.	The natural number 1 is : (A) a prime number. (B) a composite number. (C) prime as well as composite. (D) neither prime nor composite.		
Sol.	(D) neither prime nor composite		**1**
3.	Given cot θ = 3, the value of cos θ is : (A) $\frac{1}{3}$ (B) $\frac{1}{\sqrt{10}}$ (C) $\frac{3}{\sqrt{10}}$ (D) $\frac{\sqrt{10}}{3}$		
Sol.	(C) $\frac{3}{\sqrt{10}}$		**1**
4.	For any natural number n, 5^n ends with the digit : (A) 0 (B) 5 (C) 3 (D) 2		
Sol.	(B) 5		**1**
5.	If 2 sin A = 1, then the value of tan A + cot A is : (A) $\sqrt{3}$ (B) $\frac{4}{\sqrt{3}}$ (C) $\frac{\sqrt{3}}{2}$ (D) 1		
Sol.	(B) $\frac{4}{\sqrt{3}}$		**1**

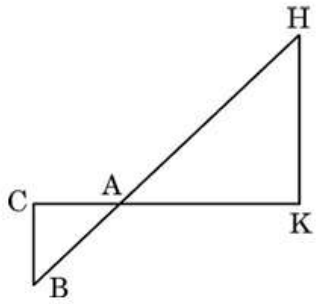
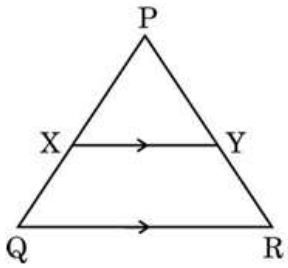
6.	The LCM of 960 and 240 is : (A) 960 (B) 240 (C) 60 (D) 15		
Sol.	(A) 960		**1**
7.	From a point on the ground, which is 60 m away from the foot of a vertical tower, the angle of elevation of the top of the tower is found to be 45°. The height (in metres) of the tower is : (A) $10\sqrt{3}$ (B) $30\sqrt{3}$ (C) 60 (D) 30		
Sol.	(C) 60		**1**
8.	How many zeroes does p(x) = (x – 2) (x + 3) have ? (A) Zero (B) One (C) Two (D) Three		
Sol.	(C) Two		**1**
9.	In the given figure, PA and PB are tangents to a circle centred at O. If ∠ OAB = 15°, then ∠ APB equals :  (A) 30° (B) 15° (C) 45° (D) 10°		
Sol.	(A) 30°		**1**
10.	If α and β are two zeroes of a polynomial $f(x) = px^2 - 2x + 3p$ and α + β = αβ, then value of p is : (A) $-\frac{2}{3}$ (B) $\frac{2}{3}$ (C) $\frac{1}{3}$ (D) $-\frac{1}{3}$		
Sol.	(B) $\frac{2}{3}$		**1**

11.	In the given figure, PA and PB are tangents to a circle centred at O. If $\angle AOB = 130°$, then $\angle APB$ is equal to :  (A) 130° (B) 50° (C) 120° (D) 90°		
Sol.	(B) 50°		**1**
12.	If the pair of linear equations : $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ is consistent and dependent, then (A) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ (B) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ (C) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ (D) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$		
Sol.	(D) $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$		**1**
13.	A hemispherical bowl is made of steel of thickness 1 cm. The outer radius of the bowl is 6 cm. The volume of steel used (in cm^3) is : (A) $182\,\pi$ (B) $\frac{182}{3}\pi$ (C) $\frac{682}{3}\pi$ (D) $\frac{364}{3}\pi$		
Sol.	(B) $\frac{182}{3}\pi$		**1**

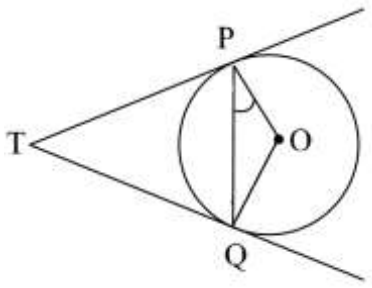
14.	Which of the following sequence is ***not*** an A.P. ? (A) $2, \frac{5}{2}, 3, \frac{7}{2}, \ldots$ (B) $-1{\cdot}2, -3{\cdot}2, -5{\cdot}2, -7{\cdot}2, \ldots$ (C) $\sqrt{2}, \sqrt{8}, \sqrt{18}, \ldots$ (D) $1^2, 3^2, 5^2, 7^2, \ldots$		
Sol.	(D) $1^2, 3^2, 5^2, 7^2, \ldots$		**1**
15.	The area of a semicircle of diameter 'd' is : (A) $\frac{\pi d^2}{16}$ (B) $\frac{\pi d^2}{4}$ (C) $\frac{\pi d^2}{8}$ (D) $\frac{\pi d^2}{2}$		
Sol.	(C) $\frac{\pi d^2}{8}$		**1**
16.	In the given figure Δ ABC is shown, in which DE $\|\|$ BC. If AD = 5 cm, DB = 2·5 cm and DE = 8 cm, then the length of BC is :  (A) 10 cm (B) 6 cm (C) 12 cm (D) 7·5 cm		
Sol.	(C) 12 cm		**1**
17.	The mean and median of a frequency distribution are 43 and 43·4 respectively. The mode of the distribution is : (A) 43·4 (B) 42·4 (C) 44·2 (D) 49·3		
Sol.	(C) 44.2		**1**

18.	The probability for a randomly selected number out of 1, 2, 3, 4, ..., 25 to be a composite number is : (A) $\frac{15}{25}$ (B) $\frac{10}{25}$ (C) $\frac{11}{25}$ (D) $\frac{9}{25}$		
Sol.	(A) $\frac{15}{25}$		**1**
	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.* (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A). (B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of the Assertion (A). (C) Assertion (A) is true, but Reason (R) is false. (D) Assertion (A) is false, but Reason (R) is true.		
19.	*Assertion (A) :* The surface area of the cuboid formed by joining two cubes of sides 4 cm each, end-to-end, is 160 cm^2. *Reason (R):* The surface area of a cuboid of dimensions $l \times b \times h$ is $(lb + bh + hl)$.		
Sol.	(C) Assertion (A) is true, but Reason (R) is false		**1**
20.	*Assertion (A) :* The mean of first 'n' natural numbers is $\frac{n-1}{2}$. *Reason (R):* The sum of first 'n' natural numbers is $\frac{n(n+1)}{2}$.		
Sol.	(D) Assertion (A) is false, but Reason (R) is true		**1**

	SECTION B This section has **5** Very Short Answer (VSA) type questions carrying 2 marks each.		
21.	**If the distance between the points (4, p) and (1, 0) is 5, what is the value of p ?**		
Sol.	$\sqrt{(4-1)^2+(p-0)^2} = 5$	**I**	**1**
	$\Longrightarrow 9 + p^2 = 25$	**II**	½
	$\Longrightarrow p = \pm 4$	**III**	½
22.	**In the given figure, O is the centre of the circle. PQ and PR are tangents. Show that the quadrilateral PQOR is cyclic.**  		
Sol.	As radius is perpendicular to tangent,		
	∠ PQO = 90°, ∠PRO = 90°	**I**	**1**
	∴ ∠ PQO + ∠PRO = 180°	**II**	½
	One pair of opposite angles is supplementary	**III**	½
	∴Quadrilateral PQOR is cyclic		
23.	**If α, β are the zeroes of the quadratic polynomial $px^2 + qx + r$, then find the value of $\alpha^3\beta + \beta^3\alpha$.**		
Sol.	$px^2 + qx + r$		
	$\alpha + \beta = \frac{-q}{p}$, $\alpha\beta = \frac{r}{p}$	**I**	**1**
	$\alpha^3\beta + \beta^3\alpha$		
	$= \alpha\beta\,(\alpha^2 + \beta^2)$		
	$= \alpha\beta\,[(\alpha+\beta)^2 - 2\alpha\beta] = \frac{r}{p}\left[\left(-\frac{q}{p}\right)^2 - 2\left(\frac{r}{p}\right)\right]$	**II**	½

	$= \frac{r}{p^3}(q^2 - 2pr)$	**III**	½
24(a)	In the given figure, Δ AHK ~ Δ ABC. If AK = 10 cm, BC = 3·5 cm and HK = 7 cm, find the length of AC.  		
Sol.	$\Delta AHK \sim \Delta ABC$		
	$\frac{AK}{AC} = \frac{HK}{BC}$	**I**	**1**
	$\frac{10}{AC} = \frac{7}{3.5}$	**II**	½
	AC = 5 cm	**III**	½
	OR		
24(b)	In the given figure, XY || QR, $\frac{PQ}{XQ} = \frac{7}{3}$ and PR = 6·3 cm. Find the length of YR.  		
Sol.	XY||QR		
	$\frac{PQ}{XQ} = \frac{PR}{YR}$	**I**	**1**
	$\Rightarrow \frac{7}{3} = \frac{6.3}{YR}$	**II**	½
	$\Rightarrow YR = 2.7$ cm	**III**	½

25 (a)	If $\tan A = \frac{4}{3}$, find sin A and cos A.		
Sol.	$\sin A = \frac{4}{5}$	**I**	**1**
	$\cos A = \frac{3}{5}$	**II**	**1**
	OR		
25(b)	Express cos A and tan A in terms of sin A.		
Sol.	$\cos A = \sqrt{1 - \sin^2 A}$	**I**	**1**
	$\tan A = \frac{\sin A}{\cos A} = \frac{\sin A}{\sqrt{1-\sin^2 A}}$	**II**	**1**

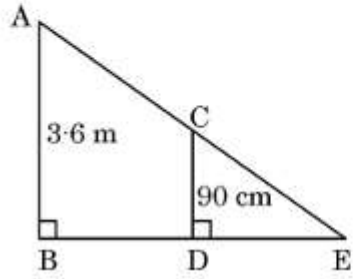
	SECTION C This section has **6** Short Answer (SA) type questions carrying 3 marks each.		
26 (a)	Prove that the lengths of tangents drawn from an external point to a circle are equal.		
Sol.	for correct figure	**I**	**1**
	for correct Given, To Prove	**II**	**½**
	for correct Proof	**III**	**1½**
	OR		
26(b)	Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$.		
Sol.			
	For correct figure	**I**	**½**
	$OP = OQ \Rightarrow \angle OPQ = \angle OQP$		

	$\angle$ OPQ + $\angle$ OQP + $\angle$POQ = 180°	**II**	½
	$\Longrightarrow \angle$ POQ = 180° − 2 $\angle$ OPQ -------(i)	**III**	½
	Also, $\angle$ OPT + $\angle$ OQT + $\angle$ POQ + $\angle$ PTQ = 360°		
	$\Longrightarrow \angle$ POQ = 180° − $\angle$ PTQ -------(ii)	**IV**	**1**
	using (i) and (ii)		
	180° − 2 $\angle$ OPQ = 180° − $\angle$ PTQ		
	$\Longrightarrow$ 2 $\angle$ OPQ = $\angle$ PTQ	**V**	½
27	**Prove that $\sqrt{5}$ is an irrational number.**		
Sol.	Let $\sqrt{5}$ be a rational number.		
	$\therefore \sqrt{5} = \frac{p}{q}$, where q ≠ 0 and p & q are coprime.	**I**	½
	$5q^2 = p^2 \Longrightarrow p^2$ is divisible by 5 $\Longrightarrow$ p is divisible by 5 ----- (i)	**II**	**1**
	let p = 5a, where 'a' is some integer		
	$25a^2 = 5q^2 \Longrightarrow q^2 = 5a^2 \Longrightarrow q^2$ is divisible by 5 $\Longrightarrow$ q is divisible by 5 --- (ii)	**III**	**1**
	(i) and (ii) leads to contradiction as 'p' and 'q' are coprime.	**IV**	½
	$\therefore \sqrt{5}$ is an irrational number.		
28.	**Find the area of the sector of a circle of radius 42 cm and of central angle 30°. Also, find the area of the corresponding major sector. [Use $\pi = \frac{22}{7}$]**		
Sol.	Area of minor sector = $\frac{30}{360} \times \frac{22}{7} \times 42 \times 42$	**I**	**1**
	= 462 cm^2	**II**	½
	Angle of corresponding major sector = 330°	**III**	½
	Area of Major Sector = $\frac{330}{360} \times \frac{22}{7} \times 42 \times 42$	**IV**	½
	= 5082 cm^2	**V**	½

29.	The three vertices of a rhombus PQRS are P(2, – 3), Q(6, 5) and R(– 2, 1). Find the coordinates of the fourth vertex S and coordinates of the point where both the diagonals PR and QS intersect.		
Sol.	Let the coordinates of fourth vertex S be (x,y)		
	Coordinates of mid-point of PR = Coordinates of mid-point of QS		
	$\left(\frac{x+6}{2}, \frac{y+5}{2}\right) = \left(\frac{2-2}{2}, \frac{-3+1}{2}\right)$	**I**	**1**
	$x = -6$	**II**	**½**
	$y = -7$	**III**	**½**
	$\therefore$ coordinates of S = $(-6, -7)$		
	mid- point of diagonal PR = $(0, -1)$	**IV**	**1**
30.	Two different dice are thrown together. Find the probability that the numbers obtained have : (i) even sum, (ii) even product.		
Sol.	(i) Number of outcomes with even sum =18		
	(1,1) (1,3) (1,5) (3,1) (3,3) (3,5) (5,1) (5,3) (5,5), (2,2) (2,4) (2,6) (4,2) (4,4) (4,6) (6,2) (6,4) (6,6)		
	P(even sum) = $\frac{18}{36}$ or $\frac{1}{2}$	**I**	**1½**
	(ii) Number of outcomes with even product = 27		
	(1,2) (1,4) (1,6) (2,1) (2,2) (2,3) (2,4) (2,5) (2,6) (3,2) (3,4) (3,6) (4,1) (4,2) (4,3) (4,4) (4,5) (4,6) (5,2) (5,4) (5,6) (6,1) (6,2) (6,3) (6,4) (6,5) (6,6)		
	P(even product) = $\frac{27}{36}$ or $\frac{3}{4}$	**II**	**1½**
31(a)	Prove that : $\frac{\sec^3\theta}{\sec^2\theta - 1} + \frac{\text{cosec}^3\theta}{\text{cosec}^2\theta - 1} = \sec\theta \cdot \text{cosec}\,\theta\,(\sec\theta + \text{cosec}\,\theta)$		
Sol.	LHS $= \frac{\sec^3\theta}{(\sec^2\theta - 1)} + \frac{\text{cosec}^3\theta}{(\text{cosec}^2\theta - 1)}$		

	$= \frac{\sec^3\theta}{\tan^2\theta} + \frac{\operatorname{cosec}^3\theta}{\cot^2\theta}$	**I**	**1**
	$= \frac{1}{\cos^3\theta} \times \frac{\cos^2\theta}{\sin^2\theta} + \frac{1}{\sin^3\theta} \times \frac{\sin^2\theta}{\cos^2\theta}$	**II**	½
	$= \frac{1}{\cos\theta \sin^2\theta} + \frac{1}{\sin\theta \cos^2\theta}$	**III**	½
	$= \frac{1}{\sin\theta\cos\theta}\left[\frac{1}{\sin\theta} + \frac{1}{\cos\theta}\right]$	**IV**	½
	$= \sec\theta \cdot \operatorname{cosec}\theta\,(\sec\theta + \operatorname{cosec}\theta) = \text{RHS}$	**V**	½
	OR		
31(b)	If $\frac{\sec\alpha}{\operatorname{cosec}\beta} = p$ and $\frac{\tan\alpha}{\operatorname{cosec}\beta} = q$, then prove that $(p^2 - q^2)\sec^2\alpha = p^2$.		
Sol.	LHS $= (p^2 - q^2)\sec^2\alpha$		
	$= \left(\frac{\sec^2\alpha}{\operatorname{cosec}^2\beta} - \frac{\tan^2\alpha}{\operatorname{cosec}^2\beta}\right) \times \sec^2\alpha$	**I**	½
	$= \left(\frac{\sec^2\alpha - \tan^2\alpha}{\operatorname{Cosec}^2\beta}\right) \times \sec^2\alpha$	**II**	**1**
	$= \left(\frac{1}{\operatorname{cosec}^2\beta}\right) \times \sec^2\alpha$	**III**	**1**
	$= p^2 = \text{RHS}$	**IV**	½

	SECTION D This section has **4** Long Answer (LA) type questions carrying 5 marks each.		
32 (a)	**Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.**		
Sol.	for correct figure, given, To prove, construction	**I**	**2**
	for correct Proof	**II**	**3**
	OR		

32 (b)	As shown in the given figure, a girl of height 90 cm is walking away from the base of a lamp post at a speed of 1·2 m/s. If the lamp is 3·6 m above the ground, find the length of her shadow after 4 seconds.  		
Sol.	BD = speed × time = $1.2 \times 4 = 4.8$ m	**I**	**1**
	$\Delta ABE \sim \Delta CDE$	**II**	**2**
	$\Longrightarrow \frac{BE}{DE} = \frac{AB}{CD}$	**III**	½
	$\Longrightarrow \frac{4.8 + DE}{DE} = \frac{3.6}{0.9}$	**IV**	**1**
	$\Longrightarrow$ DE = 1.6 m	**V**	½
	∴ Shadow of the girl after walking for 4 seconds is 1.6 m long		

33. An SBI health insurance agent found the following data for distribution of ages of 100 policy holders. The health insurance policies are given to persons of age 15 years and onwards, but less than 60 years.

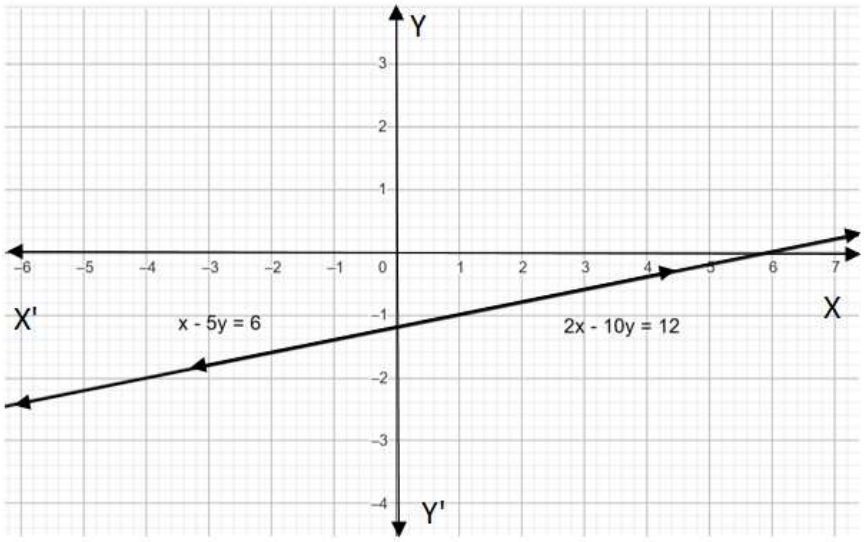
Age (in yrs)	*Number of policy holders*
15 – 20	2
20 – 25	4
25 – 30	18
30 – 35	21
35 – 40	33
40 – 45	11
45 – 50	3
50 – 55	6
55 – 60	2

Find the modal age and median age of the policy holders.

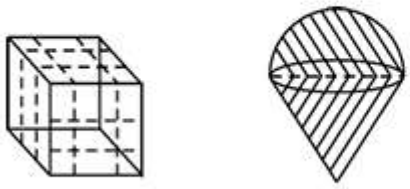
Sol.

Age (in years)	f	cf
15 - 20	2	2
20 - 25	4	6
25 - 30	18	24
30 – 35	21	45
35 - 40	33	78
40 – 45	11	89
45 - 50	3	92
50 – 55	6	98
55 – 60	2	100
Total	100	

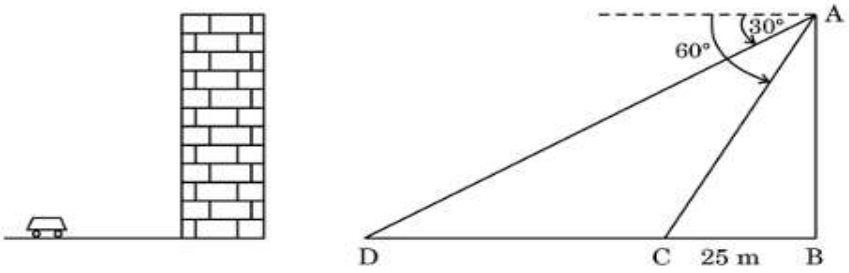
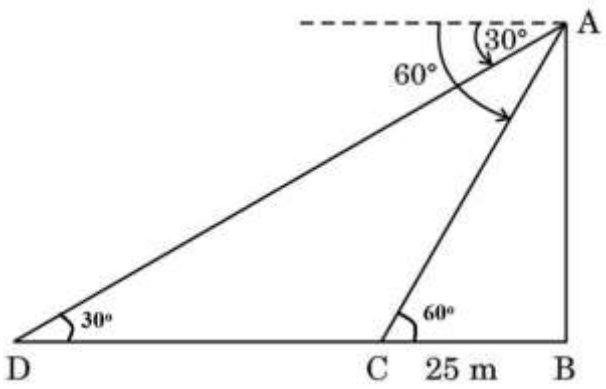
For correct table	**I**	**1**
Modal class = 35– 40	**II**	**½**
Mode = $35 + \frac{33-21}{2(33)-21-11} \times 5$	**III**	**1**
$= \frac{625}{17} = 36.7$(approx.)	**IV**	**½**
Modal age = 36.7 years (approx.)		
$\frac{n}{2} = 50$, Median class = 35 – 40	**V**	**½**
Median = $35 + \frac{50-45}{33} \times 5$	**VI**	**1**
$= \frac{1180}{33} = 35.7$(approx.)	**VII**	**½**
Median age = 35.7 years (approx.)		

34.	**Represent the following pair of linear equations graphically and hence comment on the condition of consistency of this pair :** **$x - 5y = 6$; $2x - 10y = 12$**		
Sol.			
	For correct graph of both the equations	**I**	**2+2**
	Since lines are coincident, so the system of linear equations is consistent with infinitely many solutions	**II**	**1**
35(a)	**In a class test, the sum of Anamika's marks obtained in Maths and Science is 30. Had she got 2 marks more in Maths and 3 marks less in Science, the product of the marks would have been 210. Find the marks she got in the two subjects.**		
Sol.	Let the marks obtained in Maths be x		
	Then the marks obtained in Science = $30 - x$		
	$(x + 2)(30 - x - 3) = 210$	**I**	**2**
	$\Rightarrow x^2 - 25x + 156 = 0$	**II**	**1**
	$\Rightarrow (x - 13)(x - 12) = 0$	**IV**	**½**
	$\therefore x = 13, x = 12$	**V**	**½**
	Either marks in Maths and Science are 13 and 17 respectively	**VI**	**½**
	or marks in Maths and Science are 12 and 18 respectively	**VII**	**½**
	OR		

35 (b)	**The length of hypotenuse (in cm) of a right-angled triangle is 6 cm more than twice the length of its shortest side. If the length of its third side is 6 cm less than thrice the length of its shortest side, find the dimensions of the triangle.**		
Sol.	Let the shortest side be x cm		
	Then hypotenuse = $(2x + 6)$ cm		
	and the third side = $(3x - 6)$ cm		
	$x^2 + (3x - 6)^2 = (2x + 6)^2$	**I**	**2**
	$\Rightarrow 6x^2 - 60x = 0$	**II**	**1**
	$\Rightarrow 6x(x - 10) = 0$	**III**	**½**
	$\Rightarrow x = 0, x = 10$		
	$x = 0$ (rejected)		
	$\therefore x = 10$	**IV**	**½**
	$\therefore$ shortest side = 10 cm		
	and hypotenuse = 26 cm	**V**	**½**
	and third side = 24 cm	**VI**	**½**

	SECTION E This section has **3** case study based questions carrying 4 marks each.		
36.	On a Sunday your parents took you to a fair. You could see lot of toys displayed and you wanted them to buy a Rubik's cube and a strawberry ice-cream for you.  Based on the information given above, answer the following questions : (i) Find the length of the diagonal of Rubik's cube if each edge measures 6 cm. (ii) Find the volume of Rubik's cube if the length of the edge is 7 cm. (iii) (a) What is the curved surface area of hemisphere (ice-cream) if the base radius is 7 cm ? **OR** (iii) (b) If two cubes of edges 4 cm are joined end-to-end, then find the surface area of the resulting cuboid.		
Sol.	(i) Length of diagonal of cube = $\sqrt{3} \times side$		
	$= 6\sqrt{3}$ cm	**I**	**1**
	(ii) Volume of Rubik's cube = $(7)^3$		
	$= 343$ cm^3	**I**	**1**
	(iii) (a) CSA of hemisphere = $2 \times \frac{22}{7} \times 7 \times 7$	**I**	**1**
	$= 308$ cm^2	**II**	**1**
	OR		
	(iii) (b) Surface area of resulting cuboid = $5(4)^2 + 5(4)^2$	**I**	**1**
	$= 160$ cm^2	**II**	**1**
	ALTERNATE SOLUTION :		
	(iii) (b) Surface area of resulting cuboid = $2(8 \times 4 + 4 \times 4 + 8 \times 4)$	**I**	**1**
	$= 160$ cm^2	**II**	**1**

37.	**Your elder brother wants to buy a car and plans to take a loan from a bank for his car. He repays his total loan of ₹ 1,18,000 by paying every month, starting with the first instalment of ₹ 1,000 and he increases the instalment by ₹ 100 every month.** **Based on the information given above, answer the following questions :** **(i) Find the amount paid by him in the 30^{th} instalment.** **(ii) If the total number of instalments is 40, what is the amount paid in the last instalment ?** **(iii) (a) What amount does he still have to pay after the 30^{th} instalment ?** **OR** **(iii) (b) Find the ratio of the tenth instalment to the last instalment.**		
Sol.	a = 1000, d = 100		
	(i) $a_{30} = 1000 + 29(100)$		
	$= 3900$	**I**	**1**
	Amount paid in 30^{th} instalment = ₹ 3900		
	(ii) $a_{40} = 1000 + 39(100)$		
	$= 4900$	**I**	**1**
	Amount paid in last instalment = ₹ 4900		
	(iii) (a) $S_{30} = \frac{30}{2} \times [2(1000) + 29 \times 100]$		
	$= 73500$	**I**	**1**
	Amount still he has to pay = 118000 – 73500 = ₹ 44500	**II**	**1**
	OR		
	(iii) (b) $\frac{a_{10}}{a_{40}} = \frac{1000+900}{1000+3900}$	**I**	**1**
	$= \frac{1900}{4900}$		
	$= \frac{19}{49}$	**II**	**1**
	The ratio is 19:49		

38.	**Tejas is standing at the top of a building and observes a car at an angle of depression of 30° as it approaches the base of the building at a uniform speed. 6 seconds later, the angle of depression increases to 60°, and at that moment, the car is 25 m away from the building.**  **Based on the information given above, answer the following questions :** **(i) What is the height of the building ?** **(ii) What is the distance between the two positions of the car ?** **(iii) (a) What would be the total time taken by the car to reach the foot of the building from the starting point ?** **OR** **(iii) (b) What is the distance of the observer from the car when it makes an angle of 60° ?**		
Sol.	 		
	(i) In ΔABC,		
	$\tan 60^o = \sqrt{3} = \frac{AB}{25}$	**I**	½
	$\Rightarrow AB = 25\sqrt{3}$	**II**	½
	∴ Height of building = $25\sqrt{3}$ m		
	(ii) In ΔABD,		

	$\tan 30^o = \frac{1}{\sqrt{3}} = \frac{25\sqrt{3}}{BD}$	**I**	½
	$\Rightarrow$ BD = 75		
	∴ Distance between two positions of car = 75 − 25 = 50 m	**II**	½
	(iii) (a) Time taken to cover the distance of 50 m = 6 sec		
	Time taken to cover the distance of 75 m = $\frac{6}{50} \times 75$	**I**	**1**
	= 9 sec	**II**	**1**
	OR		
	(iii) (b) In ΔABC,		
	$\cos 60^o = \frac{BC}{AC}$	**I**	**1**
	$\Rightarrow \frac{1}{2} = \frac{25}{AC}$		
	AC = 50	**II**	**1**
	∴ Distance of the observer from car when it makes the angle of 60^o = 50 m		