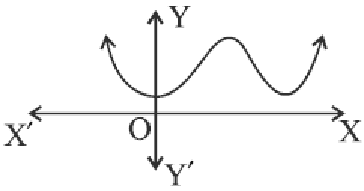
Marking Scheme **Strictly Confidential** **(For Internal and Restricted use only)** **Secondary School Examination, 2026** **MATHEMATICS (STANDARD) (041) (PAPER CODE 30/1/3)**

General Instructions: -

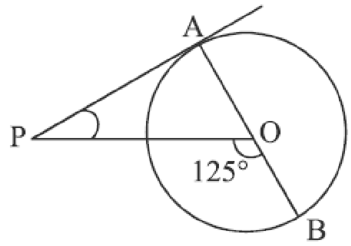
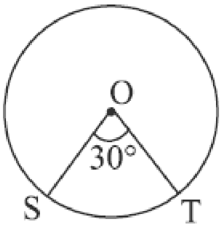
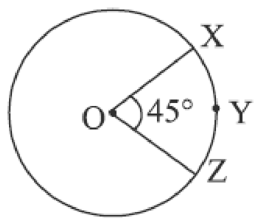
1.	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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: 30/1/3)

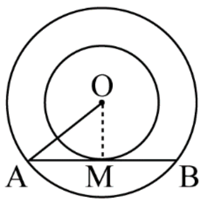
Q. No.	EXPECTED OUTCOMES/VALUE POINTS	Step	Marks
	SECTION – A **Question Numbers 1 to 20 are multiple choice questions of 1 mark each.**		
1.	For any natural number n, 6^n ends with the digit : (a) 0 (b) 6 (c) 3 (d) 2		
Sol.	(b) 6		**1**
2.	The graph of $y = f(x)$ is given. The number of zeroes of $f(x)$ is : (a) 0 (b) 1 (c) 2 (d) 4 		
Sol.	(a) 0		**1**
3.	If a pair of linear equations in two variables is represented by two coincident lines, then the pair of equations has : (a) a unique solution (b) two solutions (c) no solution (d) an infinite number of solutions		
Sol.	(d) an infinite number of solutions		**1**
4.	The common difference of the AP : $\sqrt{2}, 2\sqrt{2}, 3\sqrt{2}, 4\sqrt{2}, ...$ is : (a) $\sqrt{2}$ (b) 1 (c) $2\sqrt{2}$ (d) $-\sqrt{2}$		
Sol.	(a) $\sqrt{2}$		**1**

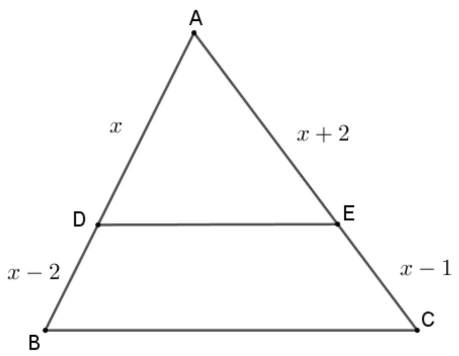
5.	If Δ ABC and Δ DEF are similar such that 2 AB = DE and BC = 8 cm, then EF is equal to : (a) 4 cm (b) 8 cm (c) 12 cm (d) 16 cm		
Sol.	(d) 16 cm		**1**
6.	The mid-point of the line segment joining the points $(5, -4)$ and $(6, 4)$ lies on : (a) x-axis (b) y-axis (c) origin (d) neither x-axis nor y-axis		
Sol.	(a) x-axis		**1**
7.	Given that $\sin\theta = \frac{a}{b}$, then $\cos\theta$ is equal to : (a) $\frac{b}{\sqrt{b^2 - a^2}}$ (b) $\frac{b}{a}$ (c) $\frac{\sqrt{b^2 - a^2}}{b}$ (d) $\frac{a}{\sqrt{b^2 - a^2}}$		
Sol.	(c) $\frac{\sqrt{b^2-a^2}}{b}$		**1**
8.	If $\cos A = \frac{1}{2}$, then the value of $\sin^2 A + 2\cos^2 A$ is : (a) $\frac{3}{2}$ (b) $\frac{5}{4}$ (c) -1 (d) $\frac{1}{2}$		
Sol.	(b) $\frac{5}{4}$		**1**
9.	The string of a flying kite is tied to a point on the ground. The length of the string between the kite and the point on the ground is 80 m. The string makes an angle of 30° with the ground. The height of the kite above the ground is : (a) $20\sqrt{3}$ m (b) 40 m (c) $40\sqrt{3}$ m (d) $80\sqrt{3}$ m		
Sol.	(b) 40 m		**1**

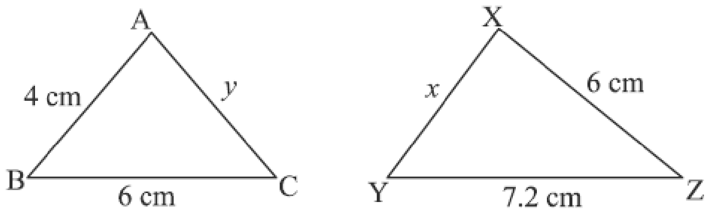
10.	If TP and TQ are two tangents to a circle with centre O from an external point T so that $\angle POQ = 120°$, then $\angle PTQ$ is equal to : (a) $60°$ (b) $70°$ (c) $80°$ (d) $90°$		
Sol.	(a) 60°		**1**
11.	In the given figure, PA is a tangent from an external point P to a circle with centre O. If $\angle POB = 125°$, then $\angle APO$ is equal to : (a) $25°$ (b) $65°$ (c) $90°$ (d) $35°$ 		
Sol.	(d) 35°		**1**
12.	Shown in the given figure is a circle with centre O. The area of the minor sector is 7 cm^2. Area of circle is : (a) $84\,\pi\ cm^2$ (b) $\frac{84}{11}\ cm^2$ (c) $84\ cm^2$ (d) $\frac{\sqrt{84}}{\sqrt{\pi}}\ cm^2$ 		
Sol.	(c) $84\ cm^2$		**1**
13.	In the given figure, O is the centre of circle. XYZ is an arc of the circle subtending an angle of $45°$ at the centre. If the radius of the circle is 32 cm, then the length of the arc XYZ is : (a) $4\,\pi$ cm (b) $8\,\pi$ cm (c) $64\,\pi$ cm (d) $128\,\pi$ cm 		
Sol.	(b) $8\,\pi$ cm		**1**

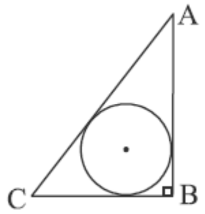
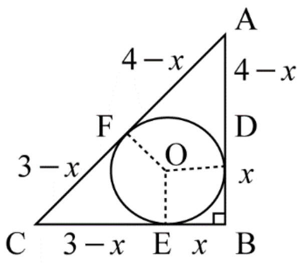
14.	The radius of a sphere (in cm) whose volume is 36π cm^3, is : (a) 3 (b) $3\sqrt{3}$ (c) $3^{\frac{2}{3}}$ (d) $3^{\frac{1}{3}}$		
Sol.	(a) 3		**1**
15.	If the mean and mode of a data are 12 and 21 respectively, then its median is : (a) 6 (b) 13.5 (c) 15 (d) 14		
Sol.	(c) 15		**1**
16.	A die is thrown once. Probability of getting a number other than 3 is : (a) $\frac{1}{6}$ (b) $\frac{3}{6}$ (c) $\frac{5}{6}$ (d) 1		
Sol.	(c) $\frac{5}{6}$		**1**
17.	The HCF of 960 and 432 is : (a) 48 (b) 54 (c) 72 (d) 36		
Sol.	(a) 48		**1**
18.	The natural number 2 is : (a) a prime number (b) a composite number (c) prime as well as composite (d) neither prime nor composite		
Sol.	(a) a prime number		**1**

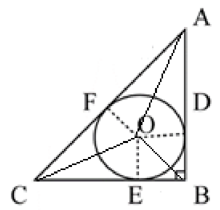
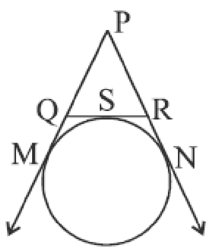
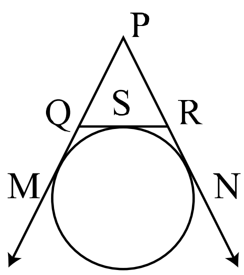
	Directions : Question numbers 19 and 20 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below : (a) Both, Assertion (A) 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 polynomial $p(y) = y^2 + 4y + 3$ has two zeroes. **Reason (R) :** A quadratic polynomial can have at most two zeroes.		
Sol.	(b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).		**1**
20.	**Assertion (A) :** The probability that a leap year has 53 Mondays is $\frac{2}{7}$. **Reason (R) :** The probability that a non-leap year has 53 Mondays is $\frac{5}{7}$.		
Sol.	(c) Assertion (A) is true, but Reason (R) is false.		**1**
	SECTION – B **Question Numbers 21 to 25 are Very Short Answer (VSA) type questions, carrying 2 marks each.**		
21.	Do the points P (1, 0), Q (– 5, 0) and R (– 2, 5) form a triangle ? If so, name the type of triangle formed.		
Sol.	$\left.\begin{array}{l} \text{PQ} = \sqrt{(-5-1)^2 + (0-0)^2} = 6 \\ \text{QR} = \sqrt{(-2+5)^2 + (5-0)^2} = \sqrt{34} \text{ or } 5.8 \\ \text{PR} = \sqrt{(-2-1)^2 + (5-0)^2} = \sqrt{34} \text{ or } 5.8 \end{array}\right\}$	**I**	**1**
	Since sum of any two sides is greater than the third side, ∴ Points P, Q and R form a triangle.	**II**	**½**
	QR = PR ⟹ PQR forms an isosceles triangle.	**III**	**½**

22 (A).	If $\tan\theta = \frac{24}{7}$, then find the value of $\sin\theta + \cos\theta$.		
Sol.	$\tan\theta = \frac{24}{7} = \frac{P}{B}$ Getting $\sin\theta = \frac{24}{25}$ and $\cos\theta = \frac{7}{25}$ $\therefore \sin\theta + \cos\theta = \frac{24}{25} + \frac{7}{25}$ $= \frac{31}{25}$	**I** **II**	**1½** **½**
	OR		
22 (B).	If $\cot\theta = \frac{7}{8}$, then find the value of $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$.		
Sol.	$\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)} = \frac{1-\sin^2\theta}{1-\cos^2\theta}$ $= \frac{\cos^2\theta}{\sin^2\theta} = \cot^2\theta$ $= \left(\frac{7}{8}\right)^2 = \frac{49}{64}$	**I** **II** **III**	**1** **½** **½**
23.	Two concentric circles are of radii 5 cm and 4 cm. Find the length of the chord of the larger circle which touches the smaller circle.		
Sol.	 Correct Figure $OM \perp AB$ $AM = \sqrt{5^2 - 4^2} = 3$ cm $AB = 2 \times 3 = 6$ cm	**I** **II** **III**	**½** **1** **½**

24.	Find a quadratic polynomial whose zeroes are $\left(5-2\sqrt{3}\right)$ and $\left(5+2\sqrt{3}\right)$.		
Sol.	Let α and β be the zeroes of the required polynomial. $\alpha = 5 - 2\sqrt{3}, \beta = 5 + 2\sqrt{3}$ $\alpha + \beta = 10$ $\alpha\beta = 13$ $\therefore$ The quadratic polynomial is $x^2 - 10x + 13$	 **I** **II** **III**	 ½ ½ **1**
25 (A).	In Δ ABC, DE || BC. If AD = x, DB = $x-2$, AE = $x+2$ and EC = $x-1$, then find the value of x.		
Sol.	 Since DE || BC $\Longrightarrow \frac{\text{AD}}{\text{DB}} = \frac{\text{AE}}{\text{EC}}$ $\Longrightarrow \frac{x}{x-2} = \frac{x+2}{x-1}$ Solving, we get $x = 4$	**I** **II** **III**	**1** ½ ½
	OR		

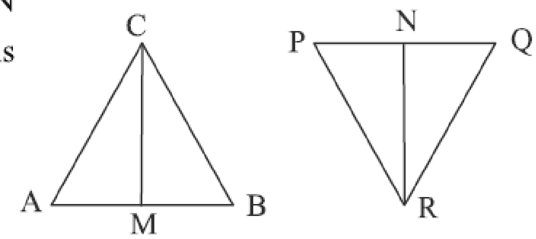
25 (B).	 In the figure given above, Δ ABC ~ Δ XYZ, then find the values of x and y.		
Sol.	$\Delta\ \text{ABC} \sim \Delta\text{XYZ} \Rightarrow \frac{\text{AB}}{\text{XY}} = \frac{\text{BC}}{\text{YZ}} = \frac{\text{AC}}{\text{XZ}}$ $\Rightarrow \frac{4}{x} = \frac{6}{7.2} = \frac{y}{6}$ Solving, we get $x = 4.8$ cm, $y = 5$ cm	**I** **II**	**1** **½ + ½**
	SECTION – C **Question numbers 26 to 31 are Short Answer (SA) type questions, carrying 3 marks each.**		
26 (A).	If $x = h + a\cos\theta$, $y = k + b\sin\theta$, then prove that : $\left(\frac{x-h}{a}\right)^2 + \left(\frac{y-k}{b}\right)^2 = 1$		
Sol.	$x = h + a\cos\theta \Rightarrow \frac{x-h}{a} = \cos\theta$ $y = k + b\cos\theta \Rightarrow \frac{y-k}{b} = \sin\theta$ $\therefore$ LHS $= \left(\frac{x-h}{a}\right)^2 + \left(\frac{y-k}{b}\right)^2 = \cos^2\theta + \sin^2\theta = 1 =$ RHS	**I** **II** **III**	**1** **1** **1**
	OR		

26 (B).	Prove that : $\dfrac{\tan A}{1+\sec A}-\dfrac{\tan A}{1-\sec A}=2\operatorname{cosec} A$		
Sol.	$\text{LHS} = \dfrac{\tan A}{1+\sec A}-\dfrac{\tan A}{1-\sec A}=\dfrac{\frac{\sin A}{\cos A}}{1+\frac{1}{\cos A}}-\dfrac{\frac{\sin A}{\cos A}}{1-\frac{1}{\cos A}}$ $=\dfrac{\sin A}{\cos A+1}-\dfrac{\sin A}{\cos A-1}$ $=\sin A\left(\dfrac{-2}{-\sin^2 A}\right)$ $=\dfrac{2}{\sin A}=2\operatorname{cosec} A=\text{RHS}$	**I** **II** **III** **IV**	**1** **½** **1** **½**
27 (A).	In the given figure, Δ ABC is a right triangle in which ∠ B = 90°, AB = 4 cm and BC = 3 cm. Find the radius of the circle inscribed in the triangle ABC.  		
Sol.	 AC = $\sqrt{3^2+4^2}=5$ cm Let BE = BD = x cm AD = $4-x$ = AF, CE = $3-x$ = CF AF + CF = AC $\Longrightarrow 4-x+3-x=5$ $\therefore x=1$ BD = BE = 1 and ∠B = 90° Hence radius of circle $= x = 1$ cm	**I** **II** **III** **IV** **V**	**½** **½** **½** **1** **½**

	ALTERNATE SOLUTION:  AC = $\sqrt{3^2 + 4^2} = 5$ cm Let r be the radius of the circle ar(ΔABC) = $\frac{1}{2} \times 4 \times 3 = 6\ cm^2$ Also, ar(ΔABC) = $\left(\frac{1}{2} \times r \times 4\right) + \left(\frac{1}{2} \times r \times 3\right) + \left(\frac{1}{2} \times r \times 5\right)$ $\Rightarrow 6r = 6 \Rightarrow r = 1$ Hence the radius of the circle is 1 cm.	I II III IV	½ ½ 1 1
	OR		
27 (B).	In the given figure, if a circle touches the side QR of Δ PQR at S and extended sides PQ and PR at M and N respectively, then prove that : PM = $\frac{1}{2}$ (PQ + QR + PR)  		
Sol.	 PM = PN QS = QM RS = RN PM + PN = PQ + QM + PR + RN	I II	1½ ½

	$2\ PM = PQ + QS + PR + RS$ $= PQ + QS + RS + PR$ $= PQ + QR + PR$ $\therefore PM = \frac{1}{2}(PQ + QR + PR)$	III IV	½ ½
28.	A right circular cylinder and a right circular cone have equal bases and equal heights. If their curved surface areas are in the ratio 8 : 5, then find the ratio between the radius of their bases to their height.		
Sol.	Let r and h be the radius and height of cylinder as well as cone respectively $\frac{2\pi rh}{\pi rl} = \frac{8}{5}$ $\Rightarrow \frac{2h}{\sqrt{r^2+h^2}} = \frac{8}{5}$ $\Rightarrow 100\ h^2 = 64\ r^2 + 64\ h^2$ $\Rightarrow 36\ h^2 = 64\ r^2$ $\therefore \frac{r}{h} = \frac{3}{4}$ Hence the required ratio is 3: 4	I II III	1 1 1
29.	Two different coins are tossed simultaneously. What is the probability of getting : (i) at least one head ? (ii) at most one tail ? (iii) a head and a tail ?		
Sol.	Possible Outcomes are HH, HT, TH, TT (i) P (at least one head) $= \frac{3}{4}$ (ii) P (at most one tail) $= \frac{3}{4}$ (iii) P (a head and a tail) $= \frac{2}{4}$ or $\frac{1}{2}$	I II III	1 1 1

30.	Prove that $\sqrt{3}$ is an irrational number.		
Sol.	Let $\sqrt{3}$ be a rational number.		
	$\therefore \sqrt{3} = \frac{p}{q}$, where $q \neq 0$ and p & q are coprime.	**I**	½
	$3q^2 = p^2 \Rightarrow p^2$ is divisible by 3 $\Rightarrow p$ is divisible by 3 ----- (i)	**II**	**1**
	Let $p = 3a$, where 'a' is some integer		
	$9a^2 = 3q^2 \Rightarrow q^2 = 3a^2 \Rightarrow q^2$ is divisible by 3		
	$\Rightarrow q$ is divisible by 3 ----- (ii)	**III**	**1**
	(i) and (ii) leads to a contradiction as 'p' and 'q' are coprime.	**IV**	½
	$\therefore \sqrt{3}$ is an irrational number.		
31.	Find the ratio in which the x-axis divides the line segment joining the points $(-6, 5)$ and $(-4, -1)$. Also, find the point of intersection.		
Sol.	$(-6, 5)$ k P 1 $(-4, -1)$ A $(x, 0)$ B		
	Let coordinates of P be $(x, 0)$ and P divides the line segement AB in the ratio k : 1	**I**	½
	$\left(\frac{-4k-6}{k+1}, \frac{-k+5}{k+1}\right) = (x, 0)$	**II**	**1**
	$\Rightarrow \frac{-k+5}{k+1} = 0 \Rightarrow k = 5$	**III**	½
	Hence the required ratio is $5:1$	**IV**	½
	$\therefore$ Coordinates of P are $\left(\frac{-4\times5-6}{5+1}, 0\right) = \left(-\frac{13}{3}, 0\right)$	**V**	½

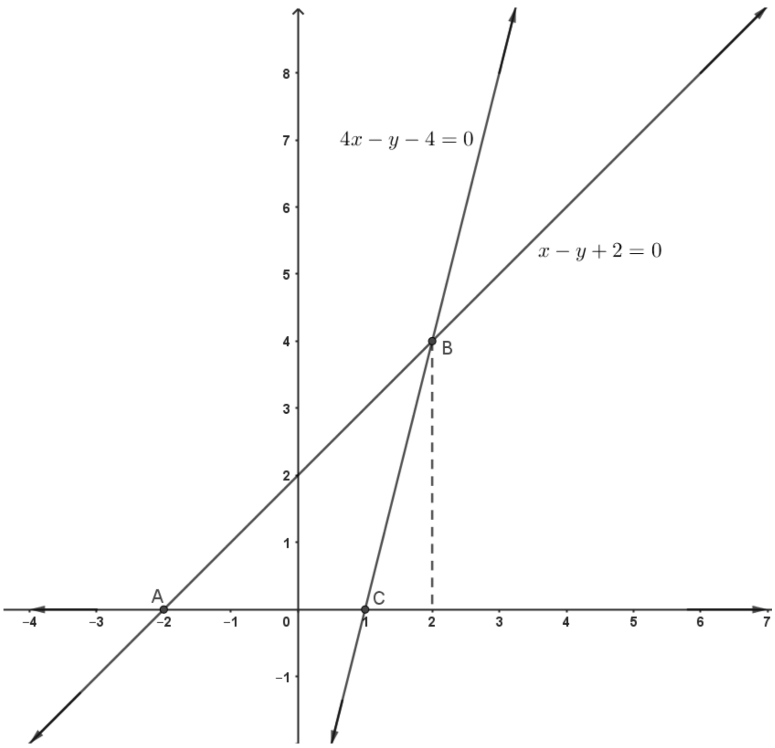
	SECTION – D **Question numbers 32 to 35 are Long Answer (LA) type questions, carrying 5 marks each.**		
32 (A).	State and prove Basic Proportionality Theorem.		
Sol.	For Correct Statement - If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. For Correct given, to prove, construction and figure For correct proof	**I** **II** **III**	**1** **2** **2**
	OR		
32 (B).	In the given figure, CM and RN are respectively the medians of Δ ABC and Δ PQR. If Δ ABC ~ Δ PQR, then prove that : (i) Δ AMC ~ Δ PNR (ii) Δ CMB ~ Δ RNQ 		
Sol.	(i) $\Delta\, ABC \sim \Delta PQR \Rightarrow \angle A = \angle P$ $\frac{AB}{PQ} = \frac{AC}{PR} \Rightarrow \frac{2\,AM}{2\,PN} = \frac{AC}{PR}$ (as CM and RN are the medians) $\therefore \Delta\, AMC \sim \Delta PNR$ (ii) $\Delta\, ABC \sim \Delta PQR \Rightarrow \angle B = \angle Q$ $\frac{AB}{PQ} = \frac{BC}{QR} \Rightarrow \frac{2\,MB}{2\,NQ} = \frac{BC}{QR}$ (as CM and RN are the medians) $\therefore \Delta\, CMB \sim \Delta RNQ$	**I** **II** **III** **IV** **V** **VI**	½ 1½ ½ ½ 1½ ½

33. The marks obtained by 80 students of class X in a mock test of Mathematics are given below in the table. Find **median** and the **mode** of the data :

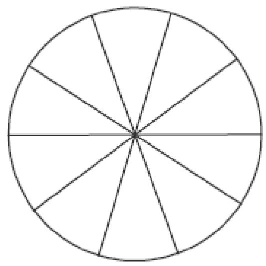
Marks	Number of Students
0 and above	80
10 and above	77
20 and above	72
30 and above	65
40 and above	55
50 and above	43
60 and above	28
70 and above	16
80 and above	10
90 and above	8
100 and above	0

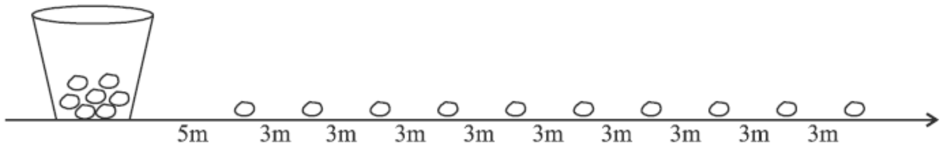
Sol.

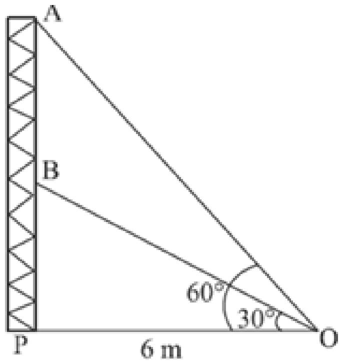
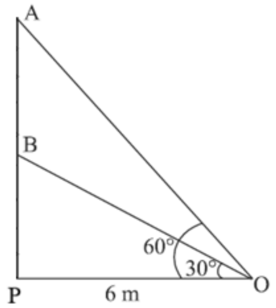
Marks	Number of Students	Class Interval	f	Cf
0 and above	80	$0-10$	3	3
10 and above	77	$10-20$	5	8
20 and above	72	$20-30$	7	15
30 and above	65	$30-40$	10	25
40 and above	55	$40-50$	12	37
50 and above	43	$50-60$	15	52
60 and above	28	$60-70$	12	64
70 and above	16	$70-80$	6	70
80 and above	10	$80-90$	2	72
90 and above	8	$90-100$	8	80
Total			80	

	Correct Table	I	1
	$n = 80 \Rightarrow \frac{n}{2} = 40$ $\therefore 50 - 60$ is the median class	II	½
	Median $= 50 + \left(\frac{40-37}{15}\right) \times 10$	III	1
	$= 50 + 2 = 52$	IV	½
	$50 - 60$ is the modal class	V	½
	Mode $= 50 + \left(\frac{15-12}{2\times15-12-12}\right) \times 10$	VI	1
	$= 50 + 5 = 55$	VII	½
34.	Draw the graph of the pair of linear equations $x - y + 2 = 0$ and $4x - y - 4 = 0$. Calculate the area of the triangle formed by the lines so drawn and the x-axis.		
Sol.			
	Correct graph of the equation $4x - y - 4 = 0$	I	2
	Correct graph of the equation $x - y + 2 = 0$	II	2
	Area of the required triangle ABC $= \frac{1}{2} \times 3 \times 4 = 6$ sq. units	III	1

35 (A).	A faster train takes one hour less than a slower train for a journey of 200 km. If the speed of the slower train is 10 km/hr less than that of the faster train, find the speeds of the two trains.		
Sol.	Let the speed of faster train be x km/h $\therefore$ speed of slower train $= (x - 10)$ km/h According to the question, $\frac{200}{x-10} - \frac{200}{x} = 1$ $\Rightarrow x^2 - 10x - 2000 = 0$ $\Rightarrow (x - 50)(x + 40) = 0$ $\therefore x = 50$ $x = -40$ (Rejected) Hence, speed of faster train $= 50$ km/h and speed of slower train $= 40$ km/h	**I** **II** **III** **IV** **V**	**2** **1** **1** **½** **½**
	OR		
35 (B).	The sum of the areas of two squares is 640 m^2. If the difference in their perimeters is 64 m, find the sides of the two squares.		
Sol.	Let the sides of the two squares be x m and y m $(x > y)$ $x^2 + y^2 = 640$ and $4x - 4y = 64 \Rightarrow y = x - 16$ $\therefore x^2 + (x - 16)^2 = 640$ $\Rightarrow x^2 - 16x - 192 = 0$ $\Rightarrow (x - 24)(x + 8) = 0$ $\therefore x = 24$	 **I** **II** **III** **IV** **V**	 **1** **1** **1** **1** **½**

	$x = -8$ (Rejected) $\Rightarrow y = 24 - 16 = 8$ Hence the sides of the two squares are 24 m and 8 m	VI	½
	SECTION – E **Question numbers 36 to 38 are Case Study Based questions, carrying 4 marks each**		
36.	A brooch is crafted from silver wire in the shape of a circle with a diameter of 35 cm. The wire is also used to create 5 diameters, dividing the circle into 10 equal sectors as shown in figure.  **Based on the above information, answer the following questions :** (i) What is the radius of circle ? (ii) What is the circumference of the brooch ? (iii) (a) What is the total length of silver wire required ? **OR** (iii) (b) What is the area of each sector of the brooch ?		
Sol.	(i) $r = \frac{35}{2}$ cm = 17.5 cm	I	1
	(ii) Circumference $= 2 \times \frac{22}{7} \times \frac{35}{2} = 110$ cm	I	1
	(iii) (a) Total length of wire required $= (5 \times 35 + 110)$ cm	I	1
	$= 285$ cm	II	1
	OR		
	(iii) (b) Central angle of each sector $= \frac{360}{10} = 36°$	I	1
	Area of each sector $= \frac{36}{360} \times \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2}$		
	$= \frac{385}{4}$ or $96.25\ cm^2$	II	1

37.	In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato. The other potatoes are arranged 3 m apart in a straight line, with a total of 10 potatoes, as shown in the figure :  A competitor starts from the bucket, picks up the nearest potato, runs back to the bucket to drop it in, then returns to pick up the next potato. This process continues until all the potatoes are in the bucket. **Based on the above information, answer the following questions :** (i) What is the distance covered to pick up the first potato and drop it in bucket ? (ii) What is the distance covered to pick up the second potato and drop it in bucket ? (iii) (a) What is the total distance the competitor has to run ? **OR** (iii) (b) If average speed of competitor is 5 m/s, then find the average time taken by competitor to put all the potatoes in the bucket.		
Sol.	(i) Required distance for the first potato = 5 + 5 = 10 m	**I**	**1**
	(ii) Required distance for the second potato = 8 + 8 = 16 m	**I**	**1**
	(iii) (a) Distances covered form an A.P. with $a = 10$ and $d = 6$	**I**	**1**
	$\therefore S_{10} = \frac{10}{2}[2 \times 10 + 9 \times 6]$ $= 5 \times 74 = 370$ m	**II**	**1**
	OR		
	(iii) (b) Distances covered form an A.P. with $a = 10$ and $d = 6$	**I**	**½**
	$\therefore S_{10} = \frac{10}{2}[2 \times 10 + 9 \times 6]$ $= 5 \times 74 = 370$ m	**II**	**1**
	Time $= \frac{370}{5} = 74$ seconds	**III**	**½**

38.	 Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure. On a similar concept, a radio station tower was built in two sections 'A' and 'B'. Tower is supported by wires from a point 'O' (as shown in figure). Distance between the base of the tower and point 'O' is 6 m. From point 'O', the angle of elevation of the top of the section 'B' is 30° and the angle of elevation of the top of section 'A' is 60°. **Based on the above information, answer the following questions :** (i) Find the length of the wire from the point 'O' to the top of section 'B'. (ii) Find the length of the wire from the point 'O' to the top of section 'A'. (iii) (a) Find the distance AB. **OR** (iii) (b) Find the area of Δ OPB.		
Sol.			
	(i) $\cos 30° = \frac{\sqrt{3}}{2} = \frac{6}{\text{OB}}$	I	½
	$\Rightarrow \text{OB} = \frac{12}{\sqrt{3}}$ or $4\sqrt{3}$ m	II	½
	(ii) $\cos 60° = \frac{1}{2} = \frac{6}{\text{OA}}$	I	½
	$\Rightarrow \text{OA} = 12$ m	II	½
	(iii) (a) $\tan 30° = \frac{1}{\sqrt{3}} = \frac{\text{BP}}{6}$		
	$\Rightarrow \text{BP} = 2\sqrt{3}$ m	I	1
	$\tan 60° = \sqrt{3} = \frac{\text{AP}}{6}$		

	$\Rightarrow \text{AP} = 6\sqrt{3}$ m	II	½
	$\text{AB} = \text{AP} - \text{BP} = 6\sqrt{3} - 2\sqrt{3} = 4\sqrt{3}$ m	III	½
	OR		
	(iii) (b) $\tan 30° = \frac{1}{\sqrt{3}} = \frac{\text{BP}}{6}$		
	$\Rightarrow \text{BP} = 2\sqrt{3}$ m	I	1
	$\text{ar}(\Delta\text{OPB}) = \frac{1}{2} \times \text{BP} \times \text{OP}$		
	$= \frac{1}{2} \times 2\sqrt{3} \times 6 = 6\sqrt{3}\, m^2$	II	1