Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2026 (X)
SUBJECT NAME- MATHEMATICS BASIC (Q.P. CODE /Set No. 241/ 430/1/1)

General Instructions:-

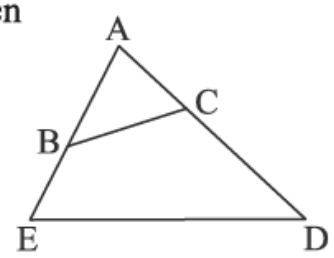
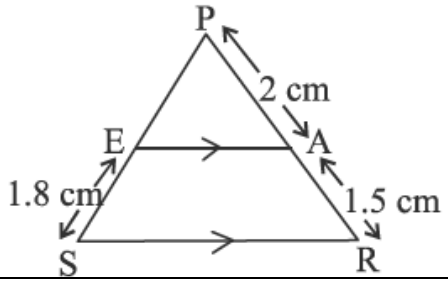
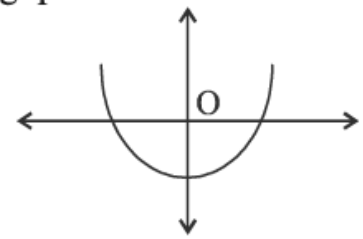
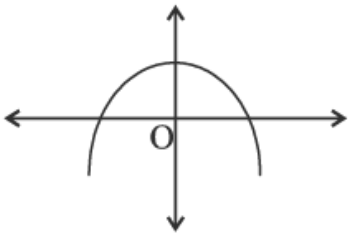
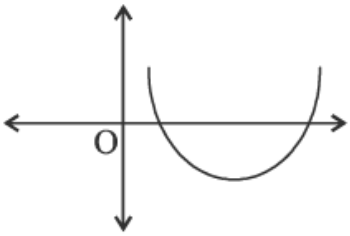
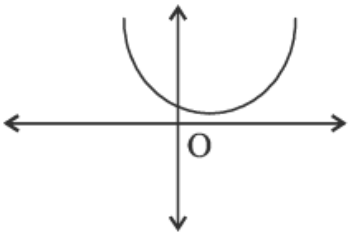
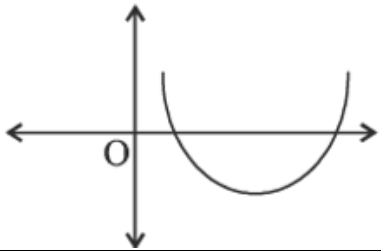
1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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. Its leakage to the 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 Newspaper/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. The 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-XII, while evaluating the competency-based questions, please try to understand the given Ans.wer and even if reply is not from a 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 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 the impression that the Answer is correct, and no marks are awarded. **This is the 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 totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, Answer to the question deserving more marks should be retained and the other Answer scored out with a note **"Extra Question"**.

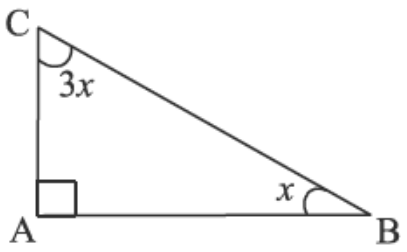
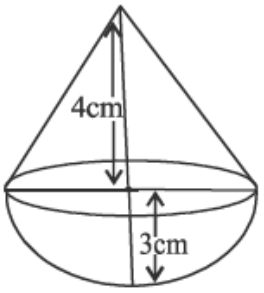
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks_ (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the Answer deserves it.
12	Every examiner must 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 totaling of marks awarded on an Answer. ● Wrong transfer of marks from the inside pages of the Answer book to the title page. ● Wrong question wise totaling on the title page. ● Wrong totaling 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 the 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 total error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, 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 totaled and written in figures and words.
18	The candidates are entitled to obtain a 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 – 430/1/1

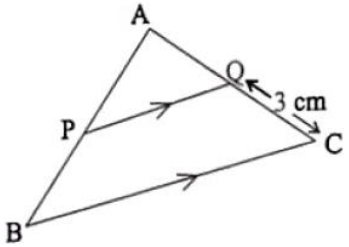
MATHEMATICS BASIC (Subject Code 241)

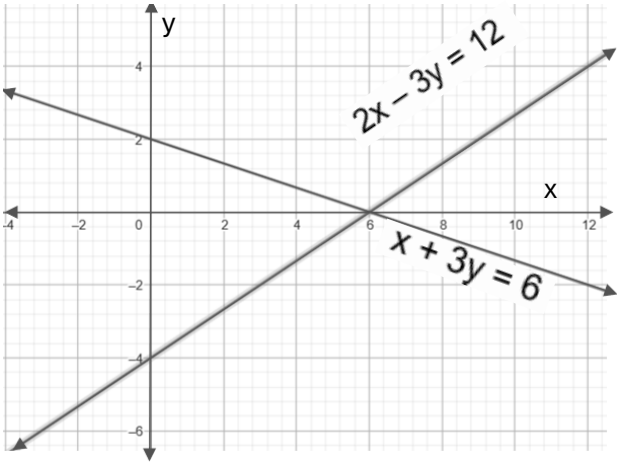
Q.No.	EXPECTED ANSWERS / VALUE POINTS	Marks
	SECTION-A This section comprises multiple choice questions (MCQs) of 1 mark each.	
1.	The HCF of $2^2.3^3$ and $3^2.2^3$ is : (a) 1 (b) 2.3 (c) $2^2.3^2$ (d) $2^3.3^3$	
Ans.	(c) $2^2.3^2$	1
2.	A letter is selected from the letters of the word FEBRUARY. The probability that it is a vowel is : (a) $\frac{1}{8}$ (b) $\frac{2}{8}$ (c) $\frac{3}{8}$ (d) $\frac{3}{7}$	
Ans.	(c) $\frac{3}{8}$	1
3.	Which of the following numbers will not end with 0 for any natural number n ? (a) $4n$ (b) 4^n (c) 3^n+1 (d) 10^{n+1}	
Ans.	(b) 4^n	1
4.	The system of linear equations $px+qy=r$ and $p_1x+q_1y=r_1$ has a unique solution, if : (a) $pq \neq p_1q_1$ (b) $pp_1 \neq qq_1$ (c) $pq_1 \neq qp_1$ (d) $pqr \neq p_1q_1r_1$	
Ans.	(c) $pq_1 \neq qp_1$	1
5.	Which of the equations among the following is/are quadratic equation(s) ? $q_1 : x^2+x=(x+1)^2$, $q_2 : x-1=x^2-1$, $q_3 : x^4=x^2$, $q_4 : \sqrt{x}=x^2\sqrt{x}+1$ (a) q_1 only (b) q_1, q_2 and q_3 only (c) q_2 only (d) q_2 and q_4 only	
Ans.	(c) q_2 only	1
6.	The discriminant of the quadratic equation $ax^2+x+a=0$ is : (a) $\sqrt{1-4a^2}$ (b) $1-4a^2$ (c) $4a^2-1$ (d) $\sqrt{4a^2-1}$	
Ans.	(b) $1-4a^2$	1
7.	The distance between points (3, 0) and (0, – 3) is : (a) 3 units (b) 6 units (c) $\sqrt{6}$ units (d) $\sqrt{18}$ units	
Ans.	(d) $\sqrt{18}$ units	1

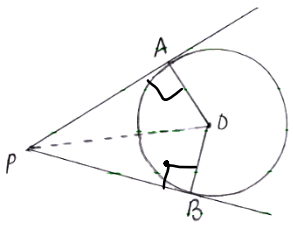
8.	If $\Delta ABC \sim \Delta ADE$ in the adjoining figure, then which of the following is true ? (a) $\frac{AB}{BE}=\frac{AC}{CD}$ (b) $\frac{AB}{AD}=\frac{AC}{AE}$ (c) $\frac{AB}{BC}=\frac{AE}{DE}$ (d) $\frac{AC}{AD}=\frac{AB}{AE}$ 	
Ans.	(b) $\frac{AB}{AD}=\frac{AC}{AE}$	1
9.	In the adjoining figure, if $EA \parallel SR$ and $PE = x$ cm, then the value of $5x$ is : (a) 2.4 cm (b) 12 cm (c) 1.35 cm (d) 6.75 cm 	
Ans.	(b) 12 cm	1
10.	Which of the following graphs represents a polynomial with both zeroes being positive ? (a)  (b)  (c)  (d) 	
Ans.	(c) 	1
11.	The system of equations $x = 2$ and $x = 3$ has : (a) unique solution (2, 3) (b) two solutions (2, 0) and (3, 0) (c) no solution (d) infinitely many solutions	
Ans.	(c) no solution	1

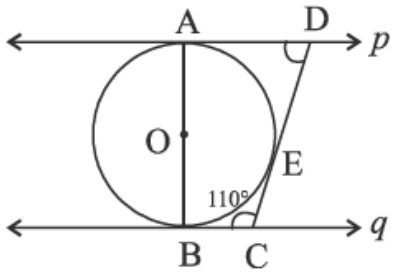
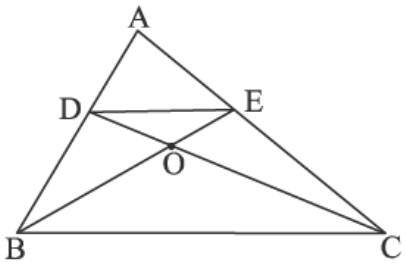
12.	The numbers $x, x+4$ and $x+8$ are in A.P. with common difference : (a) x (b) $4+x$ (c) 4 (d) 0	
Ans.	(c) 4	1
13.	Which of the following statements is **not** true ? (a) $\sin 0° = \cos 0°$ (b) $\tan 30° = \cot 60°$ (c) $\sin 30° = \cos 60°$ (d) $\sin 45° = \frac{1}{\sec 45°}$	
Ans.	(a) $\sin 0° = \cos 0°$	1
14.	If $\sqrt{3}\sin A = \cos A$, then the measure of A is : (a) 90° (b) 60° (c) 45° (d) 30°	
Ans.	(d) 30°	1
15.	In the adjoining figure, the angle of elevation of the point C from the point B, is : (a) 30° (b) 45° (c) 22.5° (d) 67.5° 	
Ans.	(c) 22.5°	1
16.	In the adjoining figure, the slant height of the conical part is : (a) 4 cm (b) 7 cm (c) 5 cm (d) 25 cm 	
Ans.	(c) 5 cm	1
17.	<table><tr><td>**Class**</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr><tr><td>**Frequency**</td><td>3</td><td>5</td><td>7</td><td>9</td><td>11</td></tr></table> The upper limit of the median class of the above data is : (a) 10 (b) 20 (c) 30 (d) 40	
Ans.	(d) 40	1

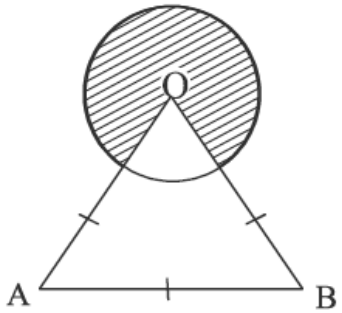
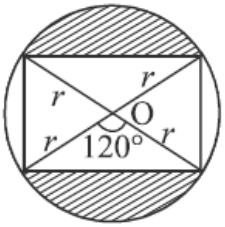
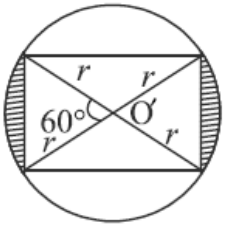
18.	If for a data, median is 5 and mode is 4, then mean is equal to : (a) 7 (b) 11 (c) $\frac{11}{2}$ (d) $\frac{14}{3}$	
Ans.	(c) $\frac{11}{2}$	1
	Directions : Question numbers 19 and 20 are Assertion and Reason based questions. Two statements are given, one labelled as Assertion (A) and the other 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 Assertion (A). (b) Both, Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of 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) :** From a bag containing 5 red balls, 2 white balls and 3 green balls, the probability of drawing a non-white ball is $\frac{4}{5}$. **Reason (R) :** For any event E, P(E) + P (not E) = 1	
Ans.	(a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of the Assertion (A).	1
20.	**Assertion (A) :** $7\times2+3$ is a composite number. **Reason (R) :** A composite number has more than two factors.	
Ans.	(d) Assertion (A) is false, but Reason (R) is true.	1
	SECTION-B This section comprises 5 Very Short Answer (VSA) type questions of 2 marks each.	
21.	Find the coordinates of the point which divides the line segment joining the points A (– 6, 10) and B (3, – 8) in the ratio 2 : 7.	
Ans.	Let the coordinates of point be (x, y) x = $\frac{2\times3+7\times(-6)}{9} = -4$, y = $\frac{2\times(-8)+7\times10}{9} = 6$ Coordinates of the point are $(-4, 6)$	1 + 1
22.	**(A)** One zero of a quadratic polynomial is twice the other. If the sum of zeroes is (– 6), find the polynomial. **OR** **(B)** If one zero of the polynomial x^2-5x-c is (–1), find the value of c. Also, find the other zero.	
Ans.	**(A)** Let the zeroes be a, 2a a + 2a = -6 gives a = -2 Polynomial is x^2+6x+8 **OR**	½ 1 ½

	(B) As -1 is the zero, so 1 + 5 – c = 0 gives c = 6 Sum of zeroes = 5 Thus, other zero is 6	1 ½ ½
23.	In the adjoining figure, $AP = \frac{1}{2}AB$ and $PQ \parallel BC$. If CQ = 3 cm, then find the length of AC.  	
Ans.	Let AC = x cm $\frac{AP}{AB} = \frac{AQ}{AC} \Rightarrow \frac{1}{2} = \frac{x-3}{x}$ $x = 6 \therefore AC = 6$ cm	1 ½ ½
24.	**(A)** Evaluate : $\sin^2 30° - \cos^2 45° + \cot^2 60°$ **OR** **(B)** If sin (A + 2B) = 2 cos 60° and A = 3B, find the measures of A and B.	
Ans.	**(A)** Given expression = $\left(\frac{1}{2}\right)^2 - \left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{1}{\sqrt{3}}\right)^2$ $= \frac{1}{12}$ **OR** **(B)** sin (A + 2B) = 1 A + 2B = 90° Using A = 3B, we get B = 18° A = 54°	1 ½ ½ ½ ½ ½ ½
25.	A box consists of 60 wall clocks, out of which 40 are good, 15 have minor defects and the remaining are broken. A trader will reject the box, if the clock taken out from the box is broken. The trader randomly takes out one clock from the box. What is the probability that : (i) the box will be rejected ? (ii) the clock taken out of the box has minor defect ?	
Ans.	(i) P(box will be rejected) = $\frac{5}{60}$ or $\frac{1}{12}$ (ii) P(clock has minor defect) = $\frac{15}{60}$ or $\frac{1}{4}$	1 1
	SECTION-C This section comprises 6 Short Answer (SA) type questions of 3 marks each.	
26.	Given that $\sqrt{5}$ is an irrational number, prove that $3+2\sqrt{5}$ is also an irrational number.	

Ans.	Let $3 + 2\sqrt{5}$ = r be a rational number So $\sqrt{5} = \frac{r-3}{2}$ RHS is a rational number So LHS is a rational number which is a contradiction Hence $3 + 2\sqrt{5}$ is an irrational number.	½ 1 1 ½
27.	**(A)** Solve the following system of equations graphically : $x+3y=6$ and $2x-3y=12$ Also, find the area of the triangle formed by the lines $x+3y=6$, $x=0$ and $y=0$. **OR** **(B)** One of the supplementary angles exceeds the other by 120°. Express the given information as a system of linear equations in two variables. Hence, find the measure of both the angles.	
Ans.	**(A)** x + 3y = 6 x | 0 | 6 y | 2 | 0 2x – 3y = 12 x | 0 | 6 y | – 4 | 0  Solution is x = 6, y = 0 or (6, 0) Required area = $\frac{1}{2} \times 2 \times 6 = 6$ **OR** **(B)** Let the angles be x and y x + y = 180° x – y = 120° solving we get x = 150° y = 30°	Correct Graph: 2 ½ ½ 1 1 ½ ½
28.	If the point P (x, y) is equidistant from the points $(3, 6)$ and $(-3, 4)$, obtain the relation between x and y. Hence, find the coordinates of point P if it lies on x-axis.	
Ans.	$\sqrt{(x-3)^2+(y-6)^2} = \sqrt{(x+3)^2+(y-4)^2}$ gives –12x – 4y = – 20 or 3x + y = 5	1 1

	As P lies on x axis so y = 0 gives x = $\frac{5}{3}$ Coordinates of P are $\left(\frac{5}{3}, 0\right)$	½ ½
29.	**(A)** Prove that : $\frac{\sin A - \tan A}{\sin A + \tan A} = \frac{1 - \sec A}{1 + \sec A}$ **OR** **(B)** If $\sin x = p$, then prove that : (i) $\cot x = \frac{\sqrt{1-p^2}}{p}$ (ii) $\frac{1+\tan^2 x}{1+\cot^2 x} = \frac{p^2}{1-p^2}$	
Ans.	**(A)** LHS = $\frac{\sin A - \frac{\sin A}{\cos A}}{\sin A + \frac{\sin A}{\cos A}}$ $= \frac{\sin A(1 - \frac{1}{\cos A})}{\sin A(1 + \frac{1}{\cos A})}$ $= \frac{1-\sec A}{1+\sec A}$ = RHS **OR** **(B)** (i) $\cot x = \frac{\cos x}{\sin x} = \frac{\sqrt{1-\sin^2 x}}{\sin x}$ $= \frac{\sqrt{1-p^2}}{p}$ (ii) $\frac{1+\tan^2 x}{1+\cot^2 x} = \frac{\sec^2 x}{\operatorname{cosec}^2 x} = \frac{\sin^2 x}{\cos^2 x}$ $= \frac{p^2}{1-p^2}$	1 1 1 1 ½ ½ + ½ ½
30.	Prove that the lengths of tangents drawn from an external point to a circle are equal.	
Ans.	Let PA and PB are tangents drawn from the external point P to the circle with centre O. To prove: PA = PB Construction: Join OA, OB and OP Proof: In Δ AOP and Δ BOP OA = OB (radii) OP = OP (common) ∠ OAP = ∠ OBP (each 90°) ∴ Δ AOP ≅ Δ BOP (RHS congruency) Hence, PA = PB (CPCT) 	Correct figure: ½ ½ 1½ ½

31.	In the adjoining figure, AB is the diameter of the circle with centre O. Two tangents p and q are drawn to the circle at points A and B respectively. Prove that $p \parallel q$. Further, a line CD touches the circle at E and $\angle BCD = 110°$. Find the measure of $\angle ADC$. 	
Ans.	$\angle DAB = 90^o, \angle CBA = 90^o$ (Angle between tangent and radius at point of contact is 90°) $\angle DAB + \angle CBA = 180^o$ Hence, $p \parallel q$ as co-interior angles are supplementary $\angle ADC = 180^o - 110^o = 70^o$	1 1 1
	SECTION-D This section comprises 4 Long Answer (LA) type questions of 5 marks each.	
32.	**(A)** Express $\frac{24}{18-x} - \frac{24}{18+x} = 1$ as a quadratic equation in standard form and find the discriminant of the quadratic equation, so obtained. Also, find the roots of the equation. **OR** **(B)** The sum of squares of two positive numbers is 100. If one number exceeds the other by 2, find the numbers.	
Ans.	**(A)** Given equation can be written as $24(18 + x) - 24(18 - x) = 324 - x^2$ i.e., $x^2 + 48x - 324 = 0$ $D = 48^2 - 4(-324) = 3600$ Roots are $\frac{-48 \pm 60}{2}$ i.e., 6, –54 **OR** **(B)** Let the numbers be x, x + 2 $x^2 + (x + 2)^2 = 100$ simplifying we get $2x^2 + 4x - 96 = 0$ or $x^2 + 2x - 48 = 0$ which gives $(x + 8)(x - 6) = 0$ $x = 6, -8$ As $x > 0$ thus, numbers are 6, 8	1 1 1 1 1 ½ 1½ 1 1 ½ ½
33.	In the adjoining figure, $\Delta ABE \cong \Delta ACD$. Prove that : (i) $\Delta ADE \sim \Delta ABC$ (ii) $\Delta BOD \sim \Delta COE$ 	

Ans.	(i) As $\Delta ABE \cong \Delta ACD$ AE = AD, AB = AC (CPCT) Getting $\frac{AD}{AB} = \frac{AE}{AC}$ and $\angle A = \angle A$ (common) $\therefore \Delta ADE \sim \Delta ABC$ (by SAS Similarity) (ii) As $\Delta ABE \cong \Delta ACD$ $\angle ABE = \angle ACD$ (CPCT) and $\angle BOD = \angle COE$ (Vertically opposite angles) $\therefore \Delta BOD \sim \Delta COE$ (by AA Similarity)	½ 1 ½ ½ 1 1 ½
34.	**(A)** In the adjoining figure, Δ OAB is an equilateral triangle and the area of the shaded region is $750\ \pi\ cm^2$. Find the perimeter of the shaded region.  **OR** **(B)** O and O′ are the centres of the circles of radius r as shown in figures (i) and (ii) respectively. (i)  (ii)  Find the ratio of area of shaded region in figure (i) to that of area of shaded region in figure (ii).	
Ans.	**(A)** $\angle AOB = 60^o$ Thus, angle of sector corresponding to shaded region = 300^o So, $\frac{300}{360}\ \pi r^2 = 750\pi$ $r^2 = 900$ r = 30 cm Perimeter of shaded region = $\frac{300}{360} \times 2 \times \pi \times 30 + 2 \times 30$ $= 50\pi + 60 = \frac{1520}{7}$ cm or 217.14 cm **OR** **(B)** Area of unshaded segments in figure (i) = $2\left(\frac{60}{360}\ \pi r^2 - \frac{\sqrt{3}}{4} r^2\right)$	½ 1 1 1 1 ½ 1

Getting length of rectangle = $\sqrt{3}r$ and width = r — 1

Area of rectangle = $\sqrt{3}r^2$ — 1

Area of shaded region in figure (i) = $\pi r^2 - 2\left(\frac{60}{360}\pi r^2 - \frac{\sqrt{3}}{4}r^2\right) - \sqrt{3}r^2$

$= \frac{2}{3}\pi r^2 - \frac{\sqrt{3}}{2}r^2$ — 1

Area of shaded region in figure (ii) = $2\left(\frac{60}{360}\pi r^2 - \frac{\sqrt{3}}{4}r^2\right) = \frac{1}{3}\pi r^2 - \frac{\sqrt{3}}{2}r^2$ — ½

Required ratio = $\frac{\frac{2}{3}\pi r^2 - \frac{\sqrt{3}}{2}r^2}{\frac{1}{3}\pi r^2 - \frac{\sqrt{3}}{2}r^2} = \frac{4\pi - 3\sqrt{3}}{2\pi - 3\sqrt{3}}$ or $(4\pi - 3\sqrt{3}) : (2\pi - 3\sqrt{3})$ — ½

or $(88 - 21\sqrt{3}) : (44 - 21\sqrt{3})$

35. The mode of the following data is 3.286 :

Family size	1-3	3-5	5-7	7-9	9-11
Number of families	7	8	2	2	1

Find the **mean** and **median** of the above data.

Ans.

Family Size	f_i	x_i	$f_i.x_i$	Cf
1-3	7	2	14	7
3-5	8	4	32	15
5-7	2	6	12	17
7-9	2	8	16	19
9-11	1	10	10	20

Correct Table: 2

Mean = $\frac{84}{20}$ = 4.2 — 1 + ½

Median = $3 + \frac{10-7}{8} \times 2$ — 1

= 3.75 — ½

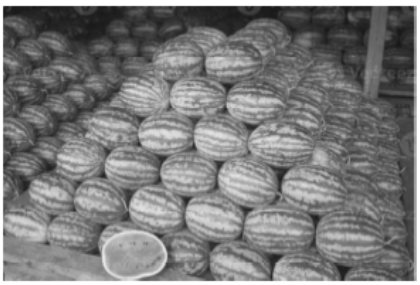
Aliter: 3median = 2(4.2) + 3.286 or 3(3.75) = 2mean + 3.286 — 1

median = 3.895 or mean = 3.982 — ½

SECTION-E

This section comprises 3 case study-based questions of 4 marks each

36. A watermelon vendor arranged the watermelons similar to shown in the adjoining picture :



The number of watermelons in subsequent rows differ by '*d*'. The bottommost row has 101 watermelons and the topmost row has 1 watermelon. There are 21 rows from bottom to top.

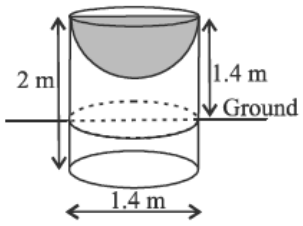
Based on the above information, answer the following questions :

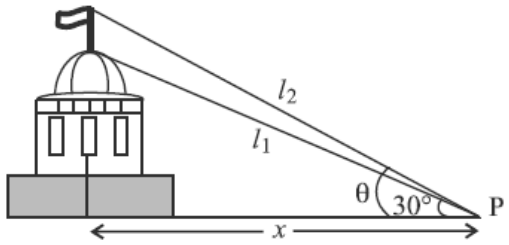
(i) Find the value of '*d*'. **1**

(ii) How many watermelons will be there in the 15th row from the bottom ? **1**

(iii) (a) Find the total number of watermelons from bottom to top. **2**

OR

	(iii) (b) If the number of watermelons in the nth row from top is equal to number of watermelons in the nth row from bottom, find the value of n. **2**	
Ans.	(i) $101 + 20d = 1$ $d = -5$ (ii) $a_{15} = 101 + 14(-5)$ $= 31$ (iii) (a) $S_{21} = \frac{21}{2}[202 + 20(-5)]$ $= 1071$ **OR** (iii) (b) $1 + (n-1)\,5 = 101 + (n-1)\,(-5)$ $n = 11$	½ ½ ½ ½ 1½ ½ 1½ ½
37.	As a part of school project, Mishika and Sahaj created a bird-bath from the cylindrical log of wood by scooping out the hemispherical depression from one end of the cylinder as shown in the figure given below. Cylinder has a length 2 m out of which 0.6 m is in earth and the diameter is 1.4 m.   **On the basis of the above information, answer the following questions :** (i) Write the radius of the hemispherical depression. **1** (ii) Find the volume of water that can be filled in the hemispherical depression in terms of π. **1** (iii) (a) Find the total surface area of log of wood above the ground after making the bird-bath. **2** **OR** (iii) (b) Compute the volume of log of wood above the ground after making the bird-bath. **2**	
Ans.	(i) Radius, r = 0.7 m (ii) Volume of water in hemispherical depression = $\frac{2}{3} \times \pi \times (0.7)^3$ $= 0.228\,\pi$ m^3 approx. or $\frac{343}{1500}\,\pi$ m^3 (iii)(a) Required area = $2 \times \pi \times (0.7) \times (1.4) + 2 \times \pi \times (0.7) \times (0.7)$ $= 2.94\,\pi$ m^2 or 9.24 m^2 or $\frac{231}{25}$ m^2 **OR** (iii)(b) Volume of log of wood = $\pi \times (0.7) \times (0.7) \times (1.4) - \frac{2}{3} \times \pi \times (0.7)^3$ $= 0.457\,\pi$ m^3 or 1.437 m^3 or $\frac{539}{375}$ m^3	1 ½ ½ 1½ ½ 1½ ½

38.	A flagstaff, 7.32 m long is fitted at the top of 10 m tall building. The flagstaff is supported by the ropes which are tied to the point P on the ground which is x m away from the base of the building. It is given that l_1 is the length of rope from point P to the base of the flagstaff and l_2 is the length of rope from point P to the top of flagstaff. Rope l_1 makes an angle of 30° with the horizontal and θ be the angle which rope l_2 makes with the horizontal as shown in the figure.  **Based on the above information, answer the following questions** : (Use $\sqrt{2} = 1.4$ and $\sqrt{3} = 1.732$) (i) Find the value of x. **1** (ii) Find the measure of angle θ. **1** (iii) (a) Find the total length of ropes needed to support the flagstaff. **2** **OR** (iii) (b) Which rope is longer l_1 or l_2 and by how much ? **2**	
Ans.	(i) $\frac{10}{x} = \tan 30^o$ x = 17.32 m (ii) $\frac{17.32}{17.32} = \tan\theta$ $\theta = 45^o$ (iii) (a) $\frac{10}{l_1} = \sin 30^o$ gives l_1 = 20 m Similarly, l_2 = 17.32 $\sqrt{2}$ = 24.248 m Total length of rope needed = 44.248 m **OR** (iii) (b) $\frac{10}{l_1} = \sin 30^0$ Gives l_1 = 20 m Similarly, l_2 = 17.32 $\sqrt{2}$ = 24.248 m l_2 is longer than l_1 by 4.248 m	½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½ ½