MATHEMATICS (BASIC)–Code No. 241

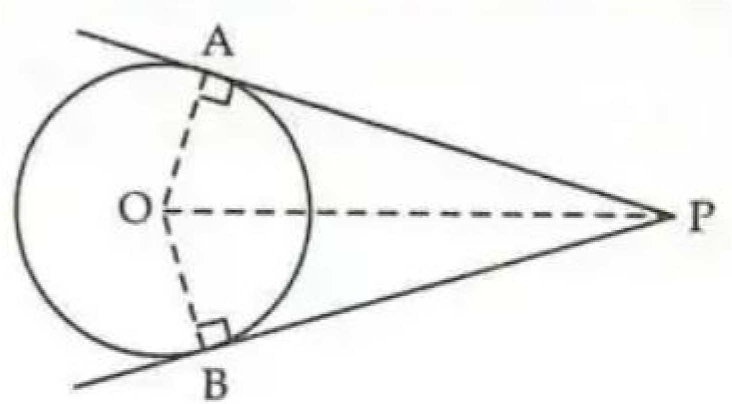
MARKING SCHEME

CLASS-X-(2025-26)

SET: 1

	Section A	
1.	b) 5	1
2.	c)$x^2+6x + 5$	1
3.	c)$4x - 6y = 3$	1
4.	b) $1/5$	1
5.	d)9	1
6.	(a)7	1
7.	c)40 m	1
8.	a) 5cm	1
9.	d)4: 7	1
10.	c)√2 a	1
11.	d)3 cm	1
12.	c) 65°	1
13.	b)7 cm	1
14.	a) $\frac{3}{8}$ Type equation here.	1
15.	d) $\frac{5}{3}$	1
16.	c) 3Median = Mode + 2 Mean	1
17.	c)30-40	1
18.	c)7	1
19.	Ans : a	1

20.	**Ans: b**	**1**
	Section B	
21.	**HCF. LCM = a.b** **40 x 120 = a x 80** **a = 60**	1/2 1/2 1
22.	$\alpha.\beta = \frac{c}{a}$ $\alpha.\frac{1}{\alpha} = \frac{3k}{5k-2}$ **5k-2 = 3k** **k = 1** **OR** $\alpha.\beta = \frac{c}{a}$ and $\alpha + \beta = \frac{-b}{a}$ $\alpha.\beta = \frac{6}{2} = 3$ and $\alpha + \beta = \frac{3}{2}$ $2\alpha + 2\beta + \alpha\beta = 2 \times 3/2 + 3 = 6$	1/2 1/2 1 1/2 1/2 1
23.	**A + B = 60** **A - B = 30** **A = 45** **B = 15** **OR** **Hypotenuse = 5** **tanθ= 3/4** **sinθ=3/5** **cosθ=4/5** $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} = \frac{3/5-4/5}{3/5+4/5} = \frac{-1}{7}$	1/2 1/2 1/2 1/2 1/2 1/2 1
24.	**x + 1/ x = 10/3** $3(x^2 + 1) = 10x$ $3x^2 - 10x + 3 = 0$ **x = 3 or 1/3**	1/2 1/2 1/2 1/2

25.	Given: PA and PB are tangents drawn to circle with centre O from external point I  To Prove: $PA = PB$ Construction: Join OA, OB and OP. Proof: $\angle OAP = \angle OBP = 90^\circ$. (Radius $\perp$ Tangent) In $\triangle OAP$ and $\triangle OBP$, $OA = OB$ (Radii of same circle) $OP = OP$ (Common side) $\angle OAP = \angle OBP$ (Each 90°) $\therefore$ $\triangle OAP \cong \triangle OBP$ (RHS congruency) $\therefore$ $PA = PB$ (c.p.c.t.c.) Thus, length of tangents drawn from an external point are equal.	1/2 11/2
	Section C	
26.	$\sin(60^\circ) = \frac{\sqrt{3}}{2}$ $\tan(45^\circ) = 1$ $\cos(60^\circ) = \frac{1}{2}$ $\cos(30^\circ) = \frac{\sqrt{3}}{2}$ $\sin(30^\circ) = \frac{1}{2}$ $\tan(60^\circ) = \sqrt{3}$	1

	$$\frac{3\left(\frac{\sqrt{3}}{2}\right)^2 + 5(1)^2 - \frac{1}{2}}{2\left(\frac{\sqrt{3}}{2}\right)^2 + \frac{1}{2} + (\sqrt{3})^2}$$	1/2
	$$\frac{\frac{9}{4} + \frac{20}{4} - \frac{2}{4}}{\frac{6}{4} + \frac{2}{4} + \frac{12}{4}} =$$	
	27/4 = 27/20 20/4	1
	OR	1/2
	$$\left(\frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}\right)^2$$	1/2
	$$= \left(\frac{1 - \sin\theta}{\cos\theta}\right)^2$$	
	$$= \frac{(1 - \sin\theta)^2}{\cos^2\theta}$$	1/2
	$$= \frac{(1 - \sin\theta)^2}{1 - \sin^2\theta}$$	1/2
	$$= \frac{(1 - \sin\theta)(1 - \sin\theta)}{(1 - \sin\theta)(1 + \sin\theta)}$$	1/2
	$$= \frac{1 - \sin\theta}{1 + \sin\theta}$$	1/2
		1/2
27.	AP = AS BP = BQ CR = CQ DR = DS	2
	Add all four equations AB + CD = AD + BC	1

28.	. **Initial assumption:** Assume that $9-7\sqrt{2}$ is a rational number. . **Definition of a rational number:** If $9-7\sqrt{2}$ is rational, it can be written as a fr $\frac{p}{q}$, where p and q are integers, and $q \neq 0$. $9-7\sqrt{2}=\frac{p}{q}$ Subtract 9 from both sides: $-7\sqrt{2}=\frac{p}{q}-9$ Combine the rational numbers on the right side: $-7\sqrt{2}=\frac{p}{q}-\frac{9q}{q}=\frac{p-9q}{q}$ Divide both sides by -7: $\sqrt{2}=\frac{p-9q}{-7q}$ **nalyze the result:** The numerator, $p-9q$, is an integer because p and q are integers, and integers a closed under multiplication and subtraction. The denominator, $-7q$, is a non-zero integer because q is a non-zero integer. This means that the expression $\frac{p-9q}{-7q}$ is a rational number. which is not possible as √2 is given irrational.	1/2 1/2 1 1

29.	Let the fraction be $\frac{x}{y}$. From the first condition, "if the numerator is multiplied by 2 and the denominato increased by 2 we get $\frac{5}{4}$", we can write the equation: $$\frac{2x}{y+2} = \frac{5}{4}$$	1/2
	Cross-multiplying gives us: $$4(2x) = 5(y+2)$$ $$8x = 5y + 10$$	1/2
	Equation (1): $8x - 5y = 10$ From the second condition, "if the numerator is increased by 1 and the denominat doubled we get $\frac{1}{2}$", we can write the equation: $$\frac{x+1}{2y} = \frac{1}{2}$$	1/2
	Cross-multiplying gives us: $$2(x+1) = 1(2y)$$ $$2x + 2 = 2y$$ Dividing by 2, we get: **Equation (2): $x + 1 = y$**	1/2

	$$8x - 5(x+1) = 10$$ $$8x - 5x - 5 = 10$$ $$3x - 5 = 10$$ $$3x = 10 + 5$$ $$3x = 15$$ $$x = 5$$ Now, substitute the value of x back into Equation (2) to find y: $$y = x + 1$$ $$y = 5 + 1$$ $$y = 6$$ Fraction = 5/6	1/2 1/2
30.	Let the arithmetic progression have a first term a and a common difference formula for the n^{th} term is $a_n = a + (n-1)d$. Given the 18th term is 63: $$a_{18} = a + (18-1)d$$ **Equation (1): $63 = a + 17d$** Given the 11th term is 42: $$a_{11} = a + (11-1)d$$ **Equation (2): $42 = a + 10d$** $$(63) - (42) = (a + 17d) - (a + 10d)$$ $$21 = 7d$$ $$d = \frac{21}{7}$$ $$d = 3$$ a = 12	1/2 1/2 1/2 1

	$a_{25} = a + (25-1)d$ $a_{25} = 12 + (24)(3)$ $a_{25} = 12 + 72$ $a_{25} = 84$ **OR** a = 8 and d = 6 $a_n = a_{41} + 72$ a+(n-1)d = a+40d + 72 6(n-1) = 240 + 72 n = 53	1/2 1/2 1/2 1 1
31.	Cf | 7 | 13 | 22 | 32 | 40 | Median = $l + \left(\frac{\frac{n}{2}-cf}{f}\right)h$ L= 40, h = 20, n = 40, f = 9, cf = 13 Median = 40 + $\left(\frac{20-13}{9}\right)$ 20 = 40 + 15.5 = 55.5	1/2 1/2 1 1
	Section D	
32.	Let the uniform speed be x Distance = 360 km Time = distance / speed Therefore, $\frac{360}{x} - \frac{360}{x+5} = 1$ $360(x+5) - 360x = x^2 + 5x$ $x^2 + 5x - 1800 = 0$ (x - 40) (x +45) = 0 x = 40 So uniform speed = 40 km/h **OR** $\frac{(5x+1)+3(x+1)}{(x+1)(5x+1)} = \frac{5}{x+4}$ $(8x+4)(x+4) = 5(5x^2+6x+1)$	1 1 1 1 1 1 1

	$8x^2+32x+4x+16 = 25x^2 + 30x + 5$ $17x^2-6x-11 = 0$ $(x-1)(x+11/17) = 0$ $x = 1$ and $-11/17$	 1 1 1
33.	Radius, r = 7 cm Height of cylinder = 24 - 14 = 10 cm Volume of a cylinder: $V_{cylinder} = \pi r^2 h$ Volume of a hemisphere: $V_{hemisphere} = \frac{2}{3}\pi r^3$ $V_{total} = V_{cylinder} + 2 \times V_{hemisphere}$ $V_{total} = \pi r^2 h + 2\left(\frac{2}{3}\pi r^3\right) = \pi r^2 h + \frac{4}{3}\pi r^3$ Substitute the values ($r = 7, h = 10, \pi = \frac{22}{7}$): $V_{total} = \left(\frac{22}{7}\right)(7)^2(10) + \frac{4}{3}\left(\frac{22}{7}\right)(7)^3$ $V_{total} = \left(\frac{22}{7}\right)(49)(10) + \frac{4}{3}\left(\frac{22}{7}\right)(343)$ $V_{total} = (22 \times 7)(10) + \frac{4}{3}(22 \times 49)$ $V_{total} = 1540 + \frac{4312}{3}$ Volume = 2977.33 cc	 1/2 1/2 1 1/2

Lateral surface area of a cylinder: $A_{cylinder} = 2\pi rh$ 1/2

Surface area of a hemisphere: $A_{hemisphere} = 2\pi r^2$ 1/2

$A_{total} = A_{cylinder} + 2 \times A_{hemisphere}$

$A_{total} = 2\pi rh + 2(2\pi r^2) = 2\pi rh + 4\pi r^2$

Substitute the values ($r = 7, h = 10, \pi = \frac{22}{7}$):

$A_{total} = 2\left(\frac{22}{7}\right)(7)(10) + 4\left(\frac{22}{7}\right)(7)^2$

$A_{total} = 2(22)(10) + 4\left(\frac{22}{7}\right)(49)$

$A_{total} = 440 + 4(22 \times 7)$

$A_{total} = 440 + 4(154)$

$A_{total} = 440 + 616$

$A_{total} = 1056 \text{ cm}^2$

1

1/2

OR

The cylindrical vessel has a radius (R) of 14 cm and a height (H) of 20 cm. The formula for the volume of a cylinder is $V_{cylinder} = \pi R^2 H$.

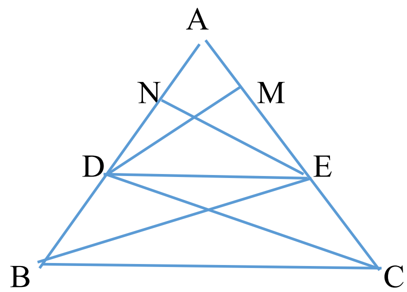
$$V_{cylinder} = \pi(14)^2(20)$$ 1/2

$$V_{cylinder} = \pi(196)(20)$$

$$V_{cylinder} = 3920\pi \text{ cm}^3$$

The initial volume of water is $3920\pi \text{ cm}^3$.

1

	The iron solid is composed of a cone and a hemisphere with a common radius (r) The height of the cone is (h) 10 cm. The formulas for the volumes are: • Volume of a cone: $V_{cone} = \frac{1}{3}\pi r^2 h$ • Volume of a hemisphere: $V_{hemisphere} = \frac{2}{3}\pi r^3$ $V_{solid} = V_{cone} + V_{hemisphere}$ $V_{solid} = \frac{1}{3}\pi(7)^2(10) + \frac{2}{3}\pi(7)^3$ $V_{solid} = \frac{1}{3}\pi(490) + \frac{2}{3}\pi(343)$ $V_{solid} = \frac{490\pi}{3} + \frac{686\pi}{3}$ $V_{solid} = \frac{1176\pi}{3} = 392\pi \text{ cm}^3$ $V_{remaining} = V_{cylinder} - V_{solid}$ $V_{remaining} = 3920\pi - 392\pi$ $V_{remaining} = 3528\pi \text{ cm}^3$ $V_{remaining} = 3528 \times \frac{22}{7} = 504 \times 22 = 11088 \text{ cm}^3$	1/2 1/2 1 1/2 1
34.	 	1/2

1. Consider the ratio of the area of $\triangle ADE$ to the area of $\triangle BDE$, both with heig EN:

$$\frac{\text{Area}(\triangle ADE)}{\text{Area}(\triangle BDE)} = \frac{\frac{1}{2} \times AD \times EN}{\frac{1}{2} \times DB \times EN} = \frac{AD}{DB} \quad \text{(Equation 1)}$$ 1/2

2. Similarly, consider the ratio of the area of $\triangle ADE$ to the area of $\triangle CDE$, both height DM:

$$\frac{\text{Area}(\triangle ADE)}{\text{Area}(\triangle CDE)} = \frac{\frac{1}{2} \times AE \times DM}{\frac{1}{2} \times EC \times DM} = \frac{AE}{EC} \quad \text{(Equation 2)}$$ 1/2

Relate the areas of $\triangle BDE$ and $\triangle CDE$.

Triangles $\triangle BDE$ and $\triangle CDE$ share the same base, DE. They also lie between tl same pair of parallel lines, DE and BC. According to a fundamental geometric property, triangles with the same base and between the same parallels have equal areas.

$$\text{Area}(\triangle BDE) = \text{Area}(\triangle CDE) \quad \text{(Equation 3)}$$ 1/2

3. **Equate the area ratios.**
From Equation (3), we know that the denominators of Equation (1) and Equation (2) equal. Since the numerators (Area($\triangle ADE$)) are also identical, the two ratios mus equal to each other.

$$\frac{\text{Area}(\triangle ADE)}{\text{Area}(\triangle BDE)} = \frac{\text{Area}(\triangle ADE)}{\text{Area}(\triangle CDE)}$$ 1/2

4. **Final conclusion.**
By substituting the results from Equation (1) and Equation (2), we can conclude tha the ratios of the corresponding sides are equal:

$$\frac{AD}{DB} = \frac{AE}{EC}$$

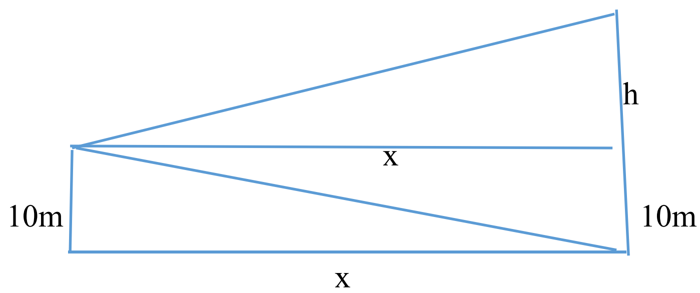
This proves that the line DE drawn parallel to side BC divides the other two sides the triangle (AB and AC) in the same ratio. 1/2

AQ || BC gives CR/AR = BR/QR 1/2

PQ || AB gives AR/PR = RB /QR 1/2

RHS is common which gives CR/AR = AR/PR 1/2

Therefore AR^2 = PR. CR 1/2

35.		1
	tan60 = h/x √3 = h/x h = √3x (1) tan30 = 10/x 1/√3 = 10/x x = 10√3 m h = √3.10√3 = 30 m Height of hill = 40 m	1 1 1 1
	Section E	
36.	**Case Study 1:** (i)Q(2,3) and R(9,3) (ii)Mid point = (5.5, 3) $PA^2 = PB^2$ $(x-2)^2 + (0-3)^2 = (x-9)^2 + (0-3)^2$ $(x-2)^2 + 9 = (x-9)^2 + 9$ $(x-2)^2 = (x-9)^2$ $x^2 - 4x + 4 = x^2 - 18x + 81$	1 1 1

	$18x - 4x = 81 - 4$ $14x = 77$ $x = \frac{77}{14}$ $x = \frac{11}{2} = 5.5$	1
	OR Base = 9-2 = 7 units Height = 9 - 3 = 6 units Area of triangle = 1/2 base x height = 1/2 x 7 x 6 = 21 sq. units	1 1
37.	**Case Study 2:** (i)Area of semi circle = $\pi r^2/2$ = 22 x 7 x 7/28 = 77/2 sq. units (i)Area = $\pi r^2/2$=22 x 2 x 2/14 = 44/7 square units (iii)Perimeter = 14 + 14 + 7 + πr = 35 + 22 x 7/14 = 46 units **OR** Total area = lxb + $\pi r^2/2$ = 14 x 7 + 22 x 7 x 7 / 7 x 8 = 98 + 77/4 = 117.2 square units	1 1 2 2
38.	**Case Study 3:** (i)Probability = 18/36 = 1/2 (ii)Probability = 4/36 = 1/9 (iii)Probability = 10/ 36 = 5/ 18 **OR** Probability = 18/36 = 1/2	1 1 2 2