

MATHEMATICS BASIC – Code No. 241
MARKING SCHEME
CLASS - X (2025 - 26)

SECTION - A		
Q. No.	Answer	Marks
1.	Answer – D As, $2025 = 3^4 \times 5^4$ So, the exponent of 3 in the prime factorization of 2025 is 4	1
2.	Answer – B On subtracting first equation from second equation, we get $2025x + 2024y - 2024x - 2025y = -1 - 1 \Rightarrow (x - y) = -2$	1
3.	Answer – D As, $f(x) = k(x + 2)(x - 5) \Rightarrow f(x) = k(x^2 - 3x - 10), k \neq 0$ Since k can be any real number. So, there are Infinitely many such polynomials.	1
4.	Answer – C On simplification, given equations reduce to (A) $x^2 + 2x - 2 = 0$ (Quadratic Equation) (B) $2x^2 - 3x - 1 = 0$ (Quadratic Equation) (C) $3x + 1 = 0$ (NOT a Quadratic Equation) (D) $4x^2 + x = 0$ (Quadratic Equation)	1
5.	Answer – A As, $2(x + 10) = (3x + 2) + 2x \Rightarrow x = 6$	1
6.	Answer – B As, $\frac{50(51)}{2} = 25k \Rightarrow k = 51$	1
7.	Answer – D Distance between the given points = $\sqrt{\left(\frac{1}{2} - \frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2} + \frac{\sqrt{3}}{2}\right)^2} = \sqrt{2}$	1
8.	Answer – C We know that, for the coordinates of a mirror image of a point in x-axis, abscissa remains the same and ordinate will be of opposite sign of the ordinate of given point. So, the Mirror image of the point $(-3, 5)$ about x-axis is $(-3, -5)$.	1
9.	Answer – B As, $\triangle ABC \sim \triangle EFD \Rightarrow \angle A = \angle E$	1

10.	Answer – B As, $\triangle ABC \sim \triangle PQR \Rightarrow \frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR} = \frac{1}{2} \Rightarrow PQ = 6 \text{ cm}, QR = 8 \text{ cm}$ Perimeter of the triangle PQR (in cm) = $6 + 8 + 10 = 24$	1
	<u>Question given for Visually impaired candidates</u> Answer – B The solution is same as above.	1
11.	Answer – A From the figure, $AE = 24 - r = AF$. So, $BF = 1 + r = 7 - r \Rightarrow r = 3 \text{ cm}$	1
	<u>Question given for Visually Impaired candidates</u> Answer – B As, $PQ = PR = 24 \text{ cm}$ So, Area of Quadrilateral PQOR (in cm^2) = $2 \times \frac{1}{2} \times 24 \times 10 = 240$	1
12.	Answer – B As, $\cot^2 x - \operatorname{cosec}^2 x = -1$, so it is NOT equal to Unity	1
13.	Answer – C As, Median class is 10-15. So, its upper limit is 15.	1
14.	Answer – C Since, $3 \text{ Median} = \text{Mode} + 2 \text{ Mean}$. So, a = 3 & b = 2 . Thus, $(2b + 3a) = 4 + 9 = 13$	1
15.	Answer – B Radius (in cm) = $\sqrt{13^2 - 12^2} = 5$	1
16.	Answer – A As, $\angle PAO = 90^\circ$. So, $\angle APO = 115^\circ - 90^\circ = 25^\circ$	1
	<u>Question given for Visually Impaired candidates</u> Answer – A As, the chord is at a distance of 18 cm (more than the radius). So, the chord will be at a distance of 5 cm on the opposite side of the centre. Thus, length of the chord CD will be $2\sqrt{13^2 - 5^2} = 24 \text{ cm}$	1
17.	Answer – C As, $r_1 : r_2 = 3 : 4$. So, the ratio of their areas = $r_1^2 : r_2^2 = 9 : 16$	1
18.	Answer – A Since, the event is most unlikely to happen. Therefore, its probability is 0.0001	1
19.	Answer – A As, Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).	1

20.	Answer – D Since events given in Assertion are not equally likely, so probability of getting two heads is not $\frac{1}{3}$. Thus, Assertion (A) is false but reason (R) is true.	1
Section –B [This section comprises of solution of very short answer type questions (VSA) of 2 marks each]		
21 (A).	It can be observed that, $2 \times 5 \times 7 \times 11 + 11 \times 13 = 11 \times (70 + 13) = 11 \times 83$ which is the product of two factors other than 1. Therefore, it is a composite number. OR	1 1
21 (B).	The smallest number which is divisible by any two numbers is their LCM. So, Number which is divisible by both 306 and 657 = LCM (306, 657) Since, $306 = 2^1 \times 3^2 \times 17^1$ and $657 = 3^2 \times 73$ $LCM (306, 657) = 2^1 \times 3^2 \times 17^1 \times 73 = 22338$	$\frac{1}{2}$ 1 $\frac{1}{2}$
22.	As, P(3, a) lies on the line L, so $3 + a = 5 \Rightarrow a = 2$ Now, the radius of the circle = $CP = \sqrt{3^2 + 2^2} = \sqrt{13}$ units <u>Question given for Visually Impaired candidates</u> Diameter of the circle = Distance between (0,0) and (6,8) = $\sqrt{6^2 + 8^2} = 10$ Radius of the circle = $\frac{1}{2}$ (Diameter of the circle) = 5 units	1 1 1½ $\frac{1}{2}$
23.	Sum of the zeroes = $2 - 3 = -(a + 1) \Rightarrow a = 0$ Product of the zeroes = $-6 = b \Rightarrow b = -6$ Hence, $a = 0$ & $b = -6$	1 1
24.	Discriminant, $D = 16 + 12\sqrt{2} > 0$ As, Discriminant is positive. So, Roots are real and distinct.	1 1
25 (A).	$2 \sin 30^\circ \tan 60^\circ - 3 \cos^2 60^\circ \sec^2 30^\circ = 2 \left(\frac{1}{2}\right) (\sqrt{3}) - 3 \left(\frac{1}{2}\right)^2 \left(\frac{2}{\sqrt{3}}\right)^2$ $= \sqrt{3} - 1$ OR	1½ $\frac{1}{2}$
25 (B).	As, $\sin x \cdot \cos x (\tan x + \cot x) = \sin x \cdot \cos x \left(\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} \right)$ $= \sin x \cdot \cos x \left(\frac{1}{\cos x \cdot \sin x} \right)$ $= 1$ (Constant) Since, the value of $\sin x \cdot \cos x (\tan x + \cot x)$ is constant, so its equal 1 for all angles.	$\frac{1}{2}$ 1½

Section –C

[This section comprises of solution short answer type questions (SA) of 3 marks each]

26.

To prove that $(\sqrt{2} - \sqrt{5})$ is an irrational number, we will use the contradiction Method.

Let, if possible, $\sqrt{2} - \sqrt{5} = x$, where x is any rational number (Clearly $x \neq 0$)

$$\text{so, } \sqrt{2} = x + \sqrt{5} \Rightarrow 2 = (x + \sqrt{5})^2$$

$$\Rightarrow 2 = x^2 + 5 + 2\sqrt{5}x$$

$$\Rightarrow -x^2 - 3 = 2\sqrt{5}x$$

$$\Rightarrow \frac{-x^2-3}{2x} = \sqrt{5} \dots\dots(1)$$

(Note: $\sqrt{5}$ is an irrational number, as the square root of any prime number is Always an irrational number)

In equation (1), LHS is a rational number while RHS is an irrational number but an irrational number cannot be equal to a rational number.

So, our assumption is wrong.

Thus, $(\sqrt{2} - \sqrt{5})$ is an irrational number.

1

1

1

27 (A).

Modal class 

Area of land (in hectares)	No. of families	
1 – 3	20	
3 – 5	45	f_0
5 – 7	80	f_1
7 – 9	55	f_2
9 – 11	40	
11 – 13	12	

$\therefore$ Modal class = 5 – 7 , $l = 5$, $h = 2$

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) h = 5 + \left(\frac{80 - 45}{2(80) - 45 - 55} \right) 2 = 6.166\dots$$

Hence, modal agriculture holdings of the village is 6.17 hectare (approx.)

OR

1

2

27 (B).

Class interval	f_i	x_i (Mid-value)	$d_i = \frac{x_i - 30}{h}$	$f_i d_i$
0-20	7	10	-1	-7
20-40	p	30	0	0
40-60	10	50	1	10
60-80	9	70	2	18
80-100	13	90	3	39
Total	39 + p			60

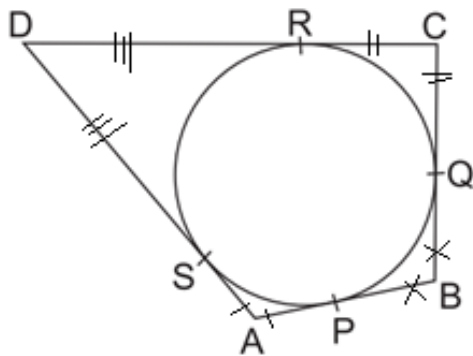
Assumed mean(A) = 30, Width of the interval (h) = 20

$$\text{Mean} = 30 + \frac{60}{39+p} \times 20 = 54 \Rightarrow 50 = 39 + p \Rightarrow p = 11$$

2

1

28.



Tangents drawn to a circle from an external point are equal.

$$\text{So, } AP = AS, PB = BQ, \\ CR = CQ, DR = DS$$

On adding the above equations,

$$(AP + PB) + (CR + RD) = (AS + BQ) + (CQ + DS)$$

$$\Rightarrow AB + CD = AD + BC$$

$$\Rightarrow \frac{AB + CD}{AD + BC} = 1$$

1½

1

½

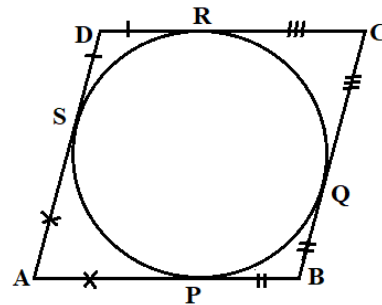
Question given for Visually Impaired candidates

Parallelogram ABCD circumscribes a circle as shown in figure.

Tangents drawn to a circle from an external point are equal

So, $AP = AS$, $PB = BQ$,

$CR = CQ$, $DR = DS$



On adding the above equations,

$$(AP + PB) + (CR + RD) = (AS + BQ) + (CQ + DS)$$

$$\Rightarrow AB + CD = AD + BC$$

$$\Rightarrow 2AB = 2BC \text{ (Opposite sides of parallelogram are equal)}$$

Thus, $AB = BC$

Since, in Parallelogram ABCD a pair of adjacent sides are equal.

Hence, ABCD is a rhombus.

1½

1

½

29 (A). According to the question,

$$1000x + 200y = 42000000 \Rightarrow 5x + y = 210000 \text{ (1)}$$

$$x + y = 50000 \text{(2)}$$

$$(1) - (2) \Rightarrow 4x = 160000$$

$$\Rightarrow x = 40000$$

Substituting value of x in (2), $y = 10000$

$\therefore$ Number of adults attended the match is 40000 and number of children attended is 10000

OR

1

½

1

½

29 (B).

$$2x + y = 6$$

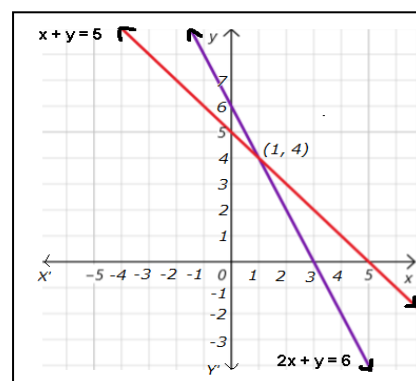
x	2	3	0
y	2	0	6

$$x + y = 5$$

x	2	5	0
y	3	0	5

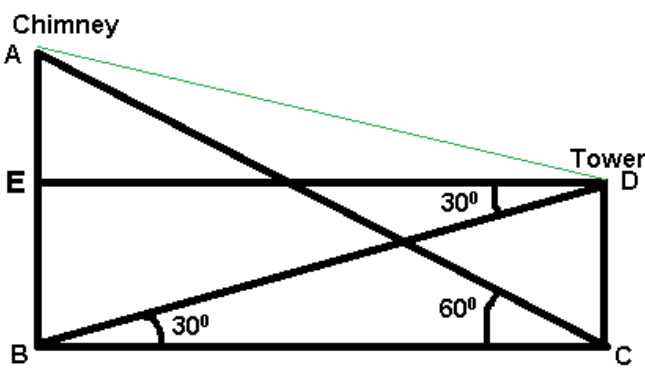
Hence solution is

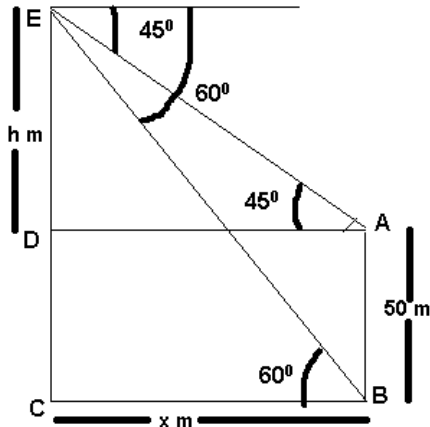
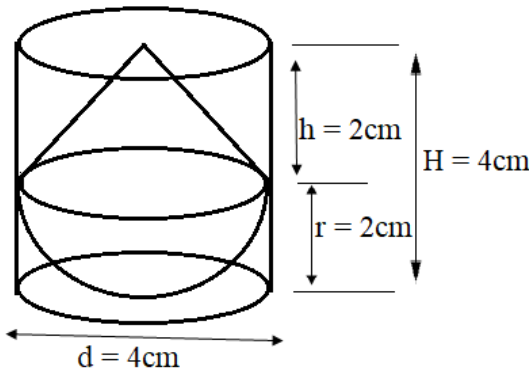
$$x = 1, y = 4$$



2
For
graph

1

33 (B)	Let the original speed of the train be x km/hr Distance travelled be 300km $\therefore$ Original time (t_o) = $\frac{300}{x}$ hr New speed of the train = $(x+5)$ km/hr $\therefore$ New time (t_n) = $\frac{300}{x+5}$ hr Given, $t_o - t_n = 2$ $\frac{300}{x} - \frac{300}{x+5} = 2$ $\frac{300(x+5) - 300(x)}{x(x+5)} = 2$ $\frac{1500}{x^2 + 5x} = 2$ $x^2 + 5x - 750 = 0$ $x^2 + 30x - 25x - 750 = 0$ $x(x+30) - 25(x+30) = 0$ $(x-25)(x+30) = 0$ $x = 25 \text{ or } x = -30 \text{ (not possible as speed cannot be negative)}$ $\therefore x = 25$ Hence, the original speed of the train is 25km/hr	$\frac{1}{2}$ $\frac{1}{2}$ 1 1½ 1 $\frac{1}{2}$
34 (A)	Let BA be the Chimney and CD be the tower.  In $\triangle CBD$, $\tan 30^\circ = \frac{40}{BC} \Rightarrow BC = 40\sqrt{3} \text{ m}$ In $\triangle ABC$, $\tan 60^\circ = \frac{AB}{40\sqrt{3}} \Rightarrow AB = 120 \text{ m}$ $AE = (120 - 40) \text{ m} = 80 \text{ m}$, $ED = BC = 40\sqrt{3} \text{ m}$ Now, $AD = \sqrt{AE^2 + ED^2} = \sqrt{6400 + 4800} = 40\sqrt{7} \text{ m}$ Thus, length of wire tied from the top of the chimney to the top of tower is $40\sqrt{7} \text{ m}$. OR	1 (for correct figure) 1½ 1½ 1

34 (B)	Let EC be the tower and AB be the building.  In $\triangle EDA$, $\tan 45^\circ = \frac{h}{x} \Rightarrow h = x$ In $\triangle EBC$, $\tan 60^\circ = \frac{EC}{BC} \Rightarrow h + 50 = \sqrt{3}h \Rightarrow h = \frac{50}{\sqrt{3}-1} = 25(\sqrt{3} + 1)m$ Thus, $h = 68.25 m = x$ (Horizontal distance between the tower and building) Now, height of the tower = $68.25 + 50 = 118.25 m$	1 (for correct figure) 1½ 1½ ½ ½
35.	 $= \frac{2}{3}\pi r^3 + \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi r^2 (2r + h) = 25.12 \text{ cm}^3$ Volume of circumscribing cylinder = $\pi r^2 H = 50.24 \text{ cm}^3$ Now, difference in the volumes of circumscribing cylinder and the toy $= \text{Vol. of cylinder} - \text{Vol. of toy}$ $= (50.24 - 25.12) \text{ cm}^3$ $= 25.12 \text{ cm}^3$ Hence, difference in the volumes of circumscribing cylinder and the toy is 25.12 cm^3.	1 (for correct figure) 2 1 1

Section –E

[This section comprises solution of 3 case- study based questions of 4 marks each with three sub parts of 1, 1 and 2 marks each respectively]

36.	(i) Distance between B and C = $4\sqrt{2}$ units (ii) Mid-point of the line joining the points B and C = (4, 4) (iii) (A) As, OA = $\sqrt{41}$ units, OB = $\sqrt{40}$ units, OC = $\sqrt{40}$ units So, society A is the farthest from the office. OR (iii) (B) As, AB = $\sqrt{13}$ units, AC = $\sqrt{5}$ units So, Society C is nearer to society A.	1 1 1½ ½ 1½ ½
37.	(i) Area of sector = $\frac{(\text{Arc length} \times \text{radius})}{2}$ (ii) Area of sector = $\frac{80}{360} \pi \times 441 = 98\pi \text{ m}^2$ (iii) (A) $\frac{80}{360} \pi \times 441 = \frac{\theta}{360} \pi \times 28^2$ $\theta = 45^\circ$ OR (iii) (B) Increase in the area of the lawn watered = $\frac{80}{360} \pi \times (784 - 441)$ $= 239.56 \text{ m}^2$	1 1 1 1 1 1
38.	(i) $x = 100 - (30 - 32 - 24 - 4) = 10$ (ii) P(selected person to have Rhesus negative blood type) = $\frac{10+8+6+1}{100}$ $= \frac{25}{100}$ or $\frac{1}{4}$ (iii) (A) P(person is Rhesus positive but neither A nor B type blood) = $\frac{30+3}{100}$ $= \frac{33}{100}$ OR (iii) (B) P(person is neither universal recipient nor universal donor) $= 1 - \frac{(3+10)}{100}$ $= 1 - \frac{13}{100}$ $= \frac{87}{100}$	1 1 1+1 1½ ½