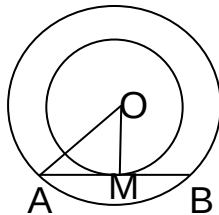


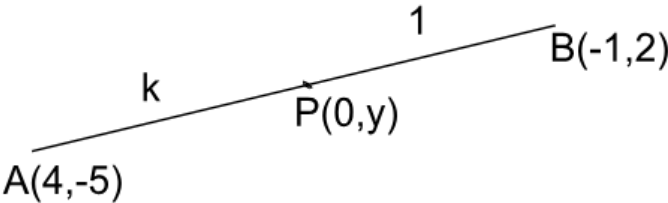
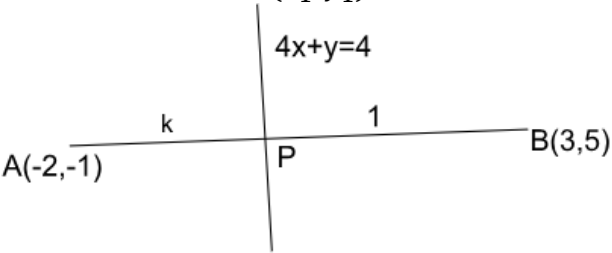
Marking Scheme
Class X Session 2024-25
MATHEMATICS BASIC (Code No.241)

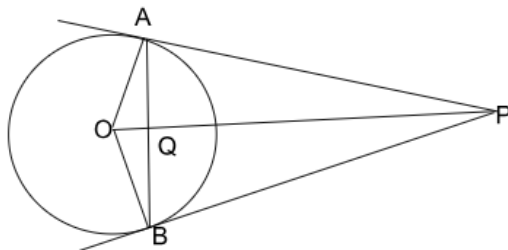
TIME: 3 hours

MAX.MARKS: 80

Q. No.	Section A	Marks
1.	B) 90	1
2.	A) consistent with unique solution	1
3.	D) 7	1
4.	C) $2\sqrt{a^2 + b^2}$	1
5.	D) 145°	1
6.	B) 15 cm	1
7.	A) $\frac{5}{4}$	1
8.	B) $\triangle EAD$	1
9.	C) 3780	1
10.	B) 40	1
11.	D) 52°	1
12.	B) 5 cm	1
13.	A) $\cos 60^\circ$	1
14.	(C) $3\pi r^2$	1
15.	D) 4	1
16.	B) real and equal	1
17.	C) 30 - 40	1
18.	D) $25x^2 - 5x - 2$	1
19.	A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)	1
20.	C) Assertion (A) is true but reason (R) is false.	1
	Section B	

21 (A).	$PA^2 = PB^2$ $\Rightarrow (x - 4)^2 + (y - 3)^2 = (x - 3)^2 + (y - 4)^2$ $\Rightarrow x = y \text{ or } x - y = 0$	1 1														
	OR															
21 (B).	AB = 6 cm = AC OC = $\sqrt{36 - 9} = 3\sqrt{3}$ cm Point C is $(3\sqrt{3}, 0)$	$\frac{1}{2}$ 1 $\frac{1}{2}$														
22.	Correct figure  AM = 4 cm $OM = \sqrt{OA^2 - AM^2}$ $= \sqrt{5^2 - 4^2}$ $= 3$ cm	$\frac{1}{2}$ 1														
23 (A).	$\frac{12}{2} [2 \times 20 + 11d] = 900$ $\Rightarrow d = 10$ Also $a_{12} = 20 + 11 \times 10 = 130$	$\frac{1}{2}$ 1 $\frac{1}{2}$														
	OR															
23 (B).	Putting $n = 1, S_1 = a = 6 - 1^2 = 5 \dots\dots\dots (i)$ Putting $n = 2, S_2 = 2a + d = 6 \times 2 - 2^2 = 8 \dots\dots\dots (ii)$ Solving (i) & (ii) $d = -2$	$\frac{1}{2}$ 1 $\frac{1}{2}$														
24.	$\sin(A - B) = \frac{1}{2} \Rightarrow A - B = 30^\circ \dots\dots\dots (i)$ $\cos(A + B) = \frac{1}{2} \Rightarrow A + B = 60^\circ \dots\dots\dots (ii)$ Solving (i) & (ii) to get $A = 45^\circ, B = 15^\circ$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$														
25.	<table border="1"><tr><td>Class</td><td>5-10</td><td>10-15</td><td>15-20</td><td>20-25</td><td>25-30</td><td>30-35</td></tr><tr><td>Frequency</td><td>5</td><td>6</td><td>15</td><td>10</td><td>5</td><td>4</td></tr></table> Modal class is 15-20. $Mode = 15 + 5 \times (\frac{15-6}{2 \times 15 - 6 - 10})$ $= 18.21(\text{approx.})$	Class	5-10	10-15	15-20	20-25	25-30	30-35	Frequency	5	6	15	10	5	4	$\frac{1}{2}$ 1 $\frac{1}{2}$
Class	5-10	10-15	15-20	20-25	25-30	30-35										
Frequency	5	6	15	10	5	4										
	Section-C															

26.	Let $\sqrt{5}$ be a rational number. $\therefore \sqrt{5} = \frac{p}{q}$, where $q \neq 0$ and p & q are coprime. $5q^2 = p^2 \Rightarrow p^2$ is divisible by 5 $\Rightarrow p$ is divisible by 5----- (i) $\Rightarrow p = 3a$, where 'a' is a postive integer $25a^2 = 5q^2 \Rightarrow q^2 = 5a^2 \Rightarrow q^2$ is divisible by 5 $\Rightarrow q$ is divisible by 5 ----- (ii) (i) and (ii) leads to contradiction as 'p' and 'q' are coprime. $\therefore \sqrt{5}$ is an irrational number.	$\frac{1}{2}$ 1 1 $\frac{1}{2}$
27(A).	 Let AP : PB be $k : 1$ Therefore, $\frac{-k+4}{k+1} = 0$ $\Rightarrow k=4$ Therefore, required ratio is 4:1 & $y = \frac{8-5}{5} = \frac{3}{5}$ Hence point of intersection is $(0, \frac{3}{5})$.	$\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	OR	
27 (B).	 $x_1 = \frac{3k-2}{k+1}$ and $y_1 = \frac{5k-1}{k+1}$ (x_1, y_1) lies on $4x + y = 4$ Therefore, $4(\frac{3k-2}{k+1}) + (\frac{5k-1}{k+1}) = 4$ $\Rightarrow k=1$ Required ratio is 1:1	1 $\frac{1}{2}$ 1 $\frac{1}{2}$

28.	$\begin{aligned} \text{LHS} &= \left(\frac{1}{\sin A} - \sin A\right)\left(\frac{1}{\cos A} - \cos A\right) \\ &= \frac{1 - \sin^2 A}{\sin A} \times \frac{1 - \cos^2 A}{\cos A} \\ &= \frac{\cos^2 A}{\sin A} \times \frac{\sin^2 A}{\cos A} \\ &= \cos A \sin A \\ \text{RHS} &= \frac{\cos A \sin A}{\sin^2 A + \cos^2 A} \\ &= \cos A \sin A = \text{LHS} \end{aligned}$	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1																																			
29.	<table><tr><th>Class</th><th>x</th><th>frequency(f)</th><th>$u = \frac{x - 25}{10}$</th><th>fu</th></tr><tr><td>0-10</td><td>5</td><td>6</td><td>-2</td><td>-12</td></tr><tr><td>10-20</td><td>15</td><td>10</td><td>-1</td><td>-10</td></tr><tr><td>20-30</td><td>25</td><td>15</td><td>0</td><td>0</td></tr><tr><td>30-40</td><td>35</td><td>9</td><td>1</td><td>9</td></tr><tr><td>40-50</td><td>45</td><td>10</td><td>2</td><td>20</td></tr><tr><td></td><td></td><td>$\Sigma f = 50$</td><td></td><td>$\Sigma fu = 7$</td></tr></table> $\begin{aligned} \text{Mean} &= 25 + 10 \times \left(\frac{7}{50}\right) \\ &= 26.4 \end{aligned}$	Class	x	frequency(f)	$u = \frac{x - 25}{10}$	fu	0-10	5	6	-2	-12	10-20	15	10	-1	-10	20-30	25	15	0	0	30-40	35	9	1	9	40-50	45	10	2	20			$\Sigma f = 50$		$\Sigma fu = 7$	Correct table $1\frac{1}{2}$ $1\frac{1}{2}$
Class	x	frequency(f)	$u = \frac{x - 25}{10}$	fu																																	
0-10	5	6	-2	-12																																	
10-20	15	10	-1	-10																																	
20-30	25	15	0	0																																	
30-40	35	9	1	9																																	
40-50	45	10	2	20																																	
		$\Sigma f = 50$		$\Sigma fu = 7$																																	
30 (A).	 (i) $\triangle OAP \cong \triangle OBP$ $\angle APO = \angle BPO$ Or OP bisects $\angle P$ (ii) $\triangle AQP \cong \triangle BQP$ $\Rightarrow AQ = QB$ and $\angle AQP = \angle BQP$ AB is a straight line therefore $\angle AQP = \angle BQP = 90^\circ$ Hence OP is right bisector of AB	 <																																			

31.	Let the two-digit number be $10x + y$ Therefore $(10x + y) + (10y + x) = 99$ $\Rightarrow x + y = 9$(i) Also, $x = 3 + y$.....(ii) Solving (i) & (ii) to get $y = 3, x = 6$ Therefore, required number is 63	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	Section D	
32 (A).	Let the number of books purchased be x Therefore, cost price of 1 book = $\frac{1920}{x}$ Therefore $\frac{1920}{x} - \frac{1920}{x+4} = 24$ $\Rightarrow 1920 \times 4 = 24x(x + 4)$ or $x^2 + 4x - 320 = 0$ $\Rightarrow (x + 20)(x - 16) = 0$ $\Rightarrow x = 16, x \neq -20$ Number of books bought=16 Price of each book = $\frac{1920}{16} = ₹120$	1 1 1 1 1
	OR	
32 (B).	Let the initial average speed of the train be x km/hr. Therefore $\frac{132}{x} + \frac{140}{x+4} = 4$ $\Rightarrow 4x^2 - 256x - 528 = 0$ or $x^2 - 64x - 132 = 0$ $\Rightarrow (x - 66)(x + 2) = 0$ $\Rightarrow x = 66, x \neq -2$ Initial average speed of train= 66 km/hr Time taken to cover the distances separately=$\frac{132}{66}$ & $\frac{140}{70}$ i.e. 2 hours each	1 1 1 1 1
33.	Correct Given, to prove, Construction and figure Correct Proof	$\frac{1}{2} \times 4 = 2$ 3
34.	(i) Perimeter of sector = $2r + \frac{2\pi r\theta}{360} = 73.12$ $\Rightarrow 2(24) + \frac{2 \times 3.14 \times 24 \times \theta}{360} = 73.12$ $\Rightarrow \theta = 60^\circ$ (ii) Area of minor segment = $\left(\frac{3.14 \times 24 \times 24 \times 60}{360} - \frac{1.73}{4} \times 24 \times 24 \right) cm^2$ = $(301.44 - 249.12) cm^2$ = $52.32 cm^2$	1 1 2 1

35 (A).	Let AB be the building and CD be the tower. Here $\tan 60^\circ = \sqrt{3} = \frac{h}{x}$ $\Rightarrow h = x\sqrt{3} \dots\dots\dots (i)$ $\tan 45^\circ = \frac{9}{x} = 1$ $\Rightarrow x = 9 \text{ m} \dots\dots\dots (ii)$ (Distance between tower and building) Solving (i) & (ii) to get $h = 9 \times 1.732 = 15.588\text{m}$ Therefore, the height of the tower $= h + 9 = 24.588 \text{ m}$.	1 mark for correct figure 1 $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	OR	
35 (B).	Let AB be the light house and C & D be positions of ships. $\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{75}{x+y}$ $\Rightarrow x + y = 75\sqrt{3} \dots\dots\dots (i)$ $\tan 45^\circ = 1 = \frac{75}{y}$ $\Rightarrow y = 75 \dots\dots\dots (ii)$ Solving (i) & (ii) to get $x = 75(\sqrt{3} - 1)$ $\Rightarrow x = 75 \times 0.732$ $= 54.9 \text{ m}$ Distance between the ships is 54.9 m	1 mark for correct figure 1 $\frac{1}{2}$ 1 $\frac{1}{2}$ 1
	Section E	
36.	(i) Number of students who do not prefer to walk $= 200 - 120 = 80$ P (selected student doesn't prefer to walk) $= \frac{80}{200}$ or $\frac{2}{5}$	$\frac{1}{2}$ $\frac{1}{2}$

	(ii) Total number of students who prefer to walk or use bicycle = $120 + 50 = 170$ P (selected student prefers to walk or use bicycle) = $\frac{170}{200}$ or $\frac{17}{20}$ (iii) (A) 50% of walking students who used bicycle = 60 Number of students who already use bicycle = 50 P (selected student uses bicycle) = $\frac{110}{200}$ or $\frac{11}{20}$ OR (B) Number of students who preferred to be dropped by car = $200 - (120 + 50 + 20)$ = 10 students P (selected student is dropped by car) = $\frac{10}{200}$ or $\frac{1}{20}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 1 1
37.	(i) 1 and 4 (ii) $x = 5/2$ (iii) (A) At $x = 5/2$, $p(x) = 2.25$ Therefore, $h = 0.10 + 2.25 = 2.35m$ OR (B) $-x^2 + 5x - 4 = 2$ $x^2 - 5x + 6 = 0$ $(x - 2)(x - 3) = 0$ $\Rightarrow x = 2 \text{ and } x = 3$ Therefore, required points are (2,0) and (3,0)	1 1 1 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
38.	(i) $l^2 = (1.2)^2 + (0.5)^2$ = $1.44 + 0.25$ $\Rightarrow l = \sqrt{1.69} = 1.3cm$ (ii) Curved surface area of sharpened part = $\pi \times 0.5 \times 1.3$ = $(0.65 \pi) cm^2$ (iii) (A) Total surface area of pencil = CSA of cylinder + CSA of cone + area of base circle = $\pi \times 0.5 \times 0.5 \times 21 + 0.65 \pi + \pi \times (0.5)^2$ = $(5.25 + 0.65 + 0.25)\pi$ = $(6.15 \pi) cm^2$ OR (B) Length of cylindrical part of shortened pencil = $(21 - 8.2) cm = 12.8 cm$ So, volume of cylindrical part of shortened pencil = $\pi \times 0.5 \times 0.5 \times 12.8$ = $(3.2 \pi) cm^3$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$