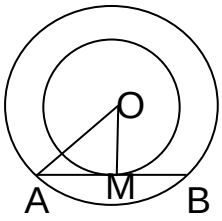
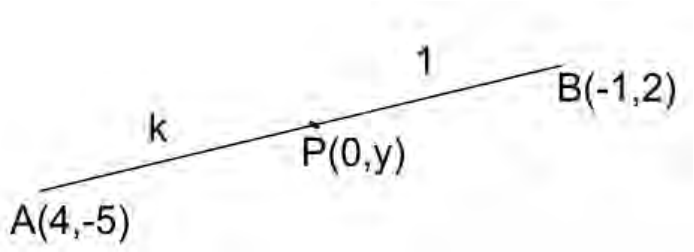
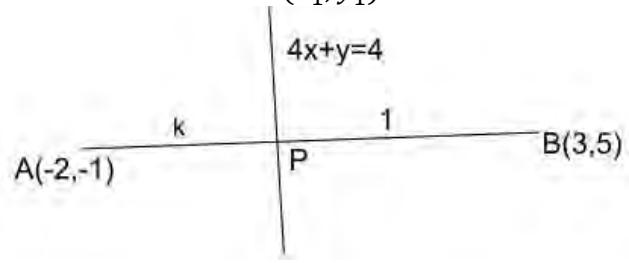
Marking Scheme
Class X Session 2024-25
MATHEMATICS BASIC (Code No.241)

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) ΔEAD	**1**
9.	C) 3780	**1**
10.	B) 40	**1**
11.	D) $52°$	**1**
12.	B) 5 cm	**1**
13.	A) $\cos 60°$	**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).	$PA^2 = PB^2$ $\Rightarrow (x-4)^2 + (y-3)^2 = (x-3)^2 + (y-4)^2$ $\Rightarrow x = y \quad or \quad x - y = 0$	**1** **1**
	OR	
21 (B).	AB = 6 cm = AC OC = $\sqrt{36-9}$ = $3\sqrt{3}$ cm Point C is ($3\sqrt{3}$, 0)	½ **1** ½
22.	Correct figure  AM = 4 cm OM = $\sqrt{OA^2 - AM^2}$ = $\sqrt{5^2 - 4^2}$ = 3 cm	½ ½ **1**
23 (A).	$\frac{12}{2}[2 \times 20 + 11d]$=900 $\Rightarrow d = 10$ Also $a_{12} = 20 + 11 \times 10 = 130$	½ **1** ½
	OR	
23 (B).	Putting $n = 1,\ S_1 = a = 6 - 1^2 = 5 \ldots\ldots\ldots\ldots (i)$ Putting $n = 2,\ S_2 = 2a + d = 6 \times 2 - 2^2 = 8 \ldots\ldots\ldots\ldots (ii)$ Solving (i) & (ii) $d = -2$	½ **1** ½
24.	$sin(A-B) = \frac{1}{2} \Rightarrow A - B = 30°$ ……..(i) $cos(A+B) = \frac{1}{2} \Rightarrow A + B = 60°$ ……..(ii) Solving (i) & (ii) to get $A = 45°, B = 15°$	½ ½ ½+½
25.	<table><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. $Mode = 15 + 5 \times (\frac{15-6}{2\times15-6-10})$ $= 18.21$(approx.)	 ½ **1** ½
	Section-C	

26.	Let $\sqrt{5}$ be a rational number. $\therefore \sqrt{5} = \frac{p}{q}$, where q≠0 and p & q are coprime. $5q^2 = p^2 \Longrightarrow p^2$ is divisible by 5 $\Longrightarrow$ p is divisible by 5----- (i) $\Longrightarrow$ p = 3a, where 'a' is a postive integer $25a^2 = 5q^2 \Longrightarrow q^2 = 5a^2 \Longrightarrow q^2$ is divisible by 5 $\Longrightarrow$ 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.	½ **1** **1** ½
27(A).	Let the required point on the y axis be P(0,y).  Let AP : PB be k : 1 Therefore, $\frac{-k+4}{k+1} = 0$ ⇒k=4 Therefore, required ratio is 4:1 & $y = \frac{8-5}{5} = \frac{3}{5}$ Hence point of intersection is $(0,\frac{3}{5})$.	½ **1** ½ ½ ½
	OR	
27 (B).	Let the line $4x + y = 4$ intersects AB at $P(x_1, y_1)$ such that AP: PB=k:1  $x_1=\frac{3k-2}{k+1}$ 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** ½ **1** ½

28.

LHS= $(\frac{1}{sinA} - sinA)(\frac{1}{cosA} - cosA)$ — ½

$=\frac{1-sin^2A}{sinA} \times \frac{1-cos^2A}{cosA}$ — 1

$=\frac{cos^2A}{sinA} \times \frac{sin^2A}{cosA}$

$=cosA\ sinA$ — ½

RHS = $\frac{cosA\ sinA}{sin^2A+cos^2A}$

$=cosA\ sinA$ = LHS — 1

29.

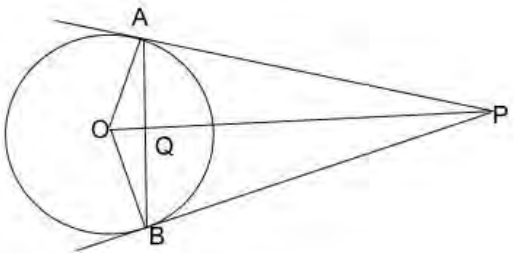
Class	x	frequency(f)	$u = \frac{x-25}{10}$	fu
0-10	5	6	-2	-12
10-20	15	10	-1	-10
20-30	25	15	0	0
30-40	35	9	1	9
40-50	45	10	2	20
		$\sum f$ =50		$\sum fu = 7$

Correct table $1\frac{1}{2}$

$Mean = 25 + 10 \times (\frac{7}{50})$ — 1

= 26.4 — ½

30 (A).



(i) $\Delta OAP \cong \Delta OBP$

$\angle APO = \angle BPO$

Or OP bisects $\angle P$ — 1

(ii)$\Delta AQP \cong \Delta BQP$

⇒AQ=QB and $\angle AQP = \angle BQP$ — 1

AB is a straight line

therefore $\angle AQP = \angle BQP = 90°$ — 1

Hence OP is right bisector of AB

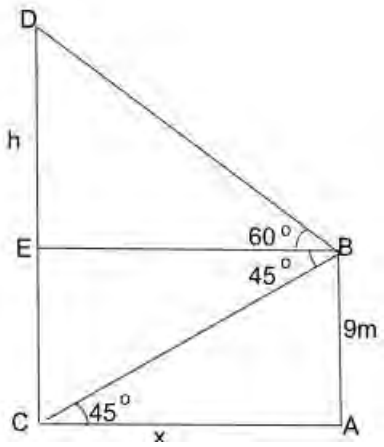
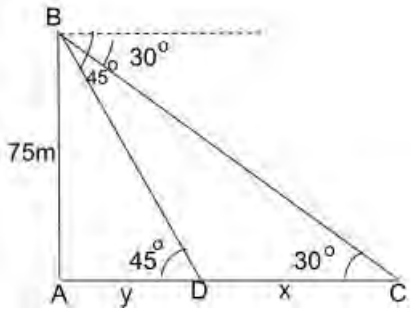
OR

30 (B).

Correct Given, to prove, figure and construction — 1

Correct proof — 2

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	½ ½ ½ ½ ½ ½
	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 = $2r + \frac{2\pi r\theta}{360} = 73.12$ $\Rightarrow 2(24) + \frac{2\times3.14\times24\times\theta}{360} = 73.12$ $\Rightarrow \theta = 60^\circ$ (ii)Area of minor segment = $\left(\frac{3.14\times24\times24\times60}{360} - \frac{1.73}{4} \times 24 \times 24\right) cm^2$ $= (301.44 - 249.12)\ cm^2$ $= 52.32\ cm^2$	**1** **1** **2** **1**

35 (A).	 Let AB be the building and CD be the tower. Here $tan60° = \sqrt{3} = \frac{h}{x}$ $\Rightarrow h = x\sqrt{3}$…….(i) $tan45° = \frac{9}{x} = 1$ $\Rightarrow\ x = 9$ m……(ii) (Distance between tower and building) Solving (i) & (ii) to get $h = 9 \times 1.732 = 15.588m$ Therefore, the height of the tower $= h + 9 = 24.588\ m$.	**1 mark for correct figure** **1** **½** **1** **½** **½** **½**
	OR	
35 (B).	 Let AB be the light house and C & D be positions of ships. $tan30°=\frac{1}{\sqrt{3}} = \frac{75}{x+y}$ $\Rightarrow x + y = 75\sqrt{3}$……..(i) $tan45°=1=\frac{75}{y}$ $\Rightarrow\ y\ =\ 75$……(ii) Solving (i) & (ii) to get $x = 75(\sqrt{3} - 1)$ $\Rightarrow x = 75 \times 0.732$ $=\ 54.9\ m$ Distance between the ships is $54.9\ m$	**1 mark for correct figure** **1** **½** **1** **½** **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 $\frac{2}{5}$	**½** **½**

	(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 $\frac{1}{20}$	½ ½ ½ ½ 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) $-x^2 + 5x - 4 = 2$ $x^2 - 5x + 6 = 0$ $(x-2)(x-3) = 0$ $\Rightarrow x = 2 \; and \; x = 3$ Therefore, required points are $(2,0)$ and $(3,0)$	1 1 1 1 ½ ½ ½ ½
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 $= \pi \times 0.5 \times 0.5 \times 12.8$ $= (3.2\,\pi)\; cm^3$	½ ½ ½ ½ ½ 1 ½ ½ 1 ½