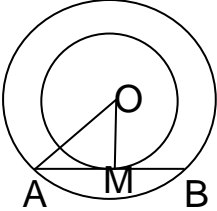


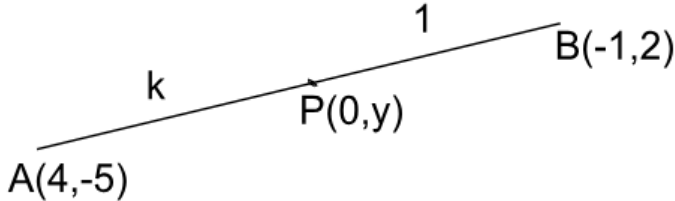
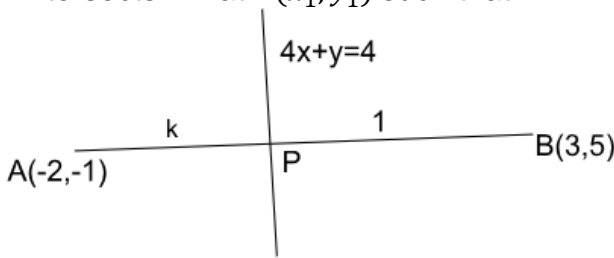
**Marking Scheme**  
**Class X Session 2024-25**  
**MATHEMATICS BASIC (Code No.241)**

**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) $145^\circ$	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) $52^\circ$	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
	<b>Section B</b>	

21 (A).	$PA^2 = PB^2$ $\Rightarrow (x - 4)^2 + (y - 3)^2 = (x - 3)^2 + (y - 4)^2$ $\Rightarrow x = y \text{ or } x - y = 0$	<b>1</b> <b>1</b>														
<b>OR</b>																
21 (B).	$AB = 6 \text{ cm} = AC$ $OC = \sqrt{36 - 9} = 3\sqrt{3} \text{ cm}$ Point C is $(3\sqrt{3}, 0)$	$\frac{1}{2}$ <b>1</b> $\frac{1}{2}$														
22.	<div style="text-align: right;">Correct figure</div>  <p>AM = 4 cm</p> $OM = \sqrt{OA^2 - AM^2}$ $= \sqrt{5^2 - 4^2}$ $= 3 \text{ cm}$	$\frac{1}{2}$ $\frac{1}{2}$ <b>1</b>														
23 (A).	$\frac{12}{2} [2 \times 20 + 11d] = 900$ $\Rightarrow d = 10$ Also $a_{12} = 20 + 11 \times 10 = 130$	$\frac{1}{2}$ <b>1</b> $\frac{1}{2}$														
<b>OR</b>																
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) $d = -2$	$\frac{1}{2}$ <b>1</b> $\frac{1}{2}$														
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" data-bbox="185 1671 1214 1805"> <tbody> <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> </tbody> </table> <p>Modal class is 15-20.</p> $Mode = 15 + 5 \times \left( \frac{15 - 6}{2 \times 15 - 6 - 10} \right)$ $= 18.21 (\text{approx.})$	Class	5-10	10-15	15-20	20-25	25-30	30-35	Frequency	5	6	15	10	5	4	$\frac{1}{2}$ <b>1</b> $\frac{1}{2}$
Class	5-10	10-15	15-20	20-25	25-30	30-35										
Frequency	5	6	15	10	5	4										
<b>Section-C</b>																

<p><b>26.</b></p>	<p>Let <math>\sqrt{5}</math> be a rational number.  <math>\therefore \sqrt{5} = \frac{p}{q}</math>, where <math>q \neq 0</math> and <math>p</math> &amp; <math>q</math> are coprime.  <math>5q^2 = p^2 \Rightarrow p^2</math> is divisible by 5  <math>\Rightarrow p</math> is divisible by 5----- (i)  <math>\Rightarrow p = 3a</math>, where 'a' is a positive integer  <math>25a^2 = 5q^2 \Rightarrow q^2 = 5a^2 \Rightarrow q^2</math> is divisible by 5  <math>\Rightarrow q</math> is divisible by 5 ----- (ii)          (i) and (ii) leads to contradiction as 'p' and 'q' are coprime.  <math>\therefore \sqrt{5}</math> is an irrational number.</p>	<p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p>
<p><b>27(A).</b></p>	<p>Let the required point on the y axis be <math>P(0,y)</math>.</p>  <p>Let <math>AP : PB</math> be <math>k : 1</math>          Therefore, <math>\frac{-k+4}{k+1} = 0</math>  <math>\Rightarrow k=4</math>          Therefore, required ratio is 4:1          &amp; <math>y = \frac{8-5}{5} = \frac{3}{5}</math>          Hence point of intersection is <math>(0, \frac{3}{5})</math>.</p>	<p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>
<b>OR</b>		
<p><b>27 (B).</b></p>	<p>Let the line <math>4x + y = 4</math> intersects <math>AB</math> at <math>P(x_1, y_1)</math> such that <math>AP: PB=k:1</math></p>  <p><math>x_1 = \frac{3k-2}{k+1}</math> and <math>y_1 = \frac{5k-1}{k+1}</math>  <math>(x_1, y_1)</math> lies on <math>4x + y = 4</math>          Therefore, <math>4\left(\frac{3k-2}{k+1}\right) + \left(\frac{5k-1}{k+1}\right) = 4</math>  <math>\Rightarrow k=1</math>          Required ratio is 1:1</p>	<p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p>

28.	$\text{LHS} = \left(\frac{1}{\sin A} - \sin A\right)\left(\frac{1}{\cos A} - \cos A\right)$ $= \frac{1 - \sin^2 A}{\sin A} \times \frac{1 - \cos^2 A}{\cos A}$ $= \frac{\cos^2 A}{\sin A} \times \frac{\sin^2 A}{\cos A}$ $= \cos A \sin A$ $\text{RHS} = \frac{\cos A \sin A}{\sin^2 A + \cos^2 A}$ $= \cos A \sin A = \text{LHS}$	1/2
		1
		1/2
		1

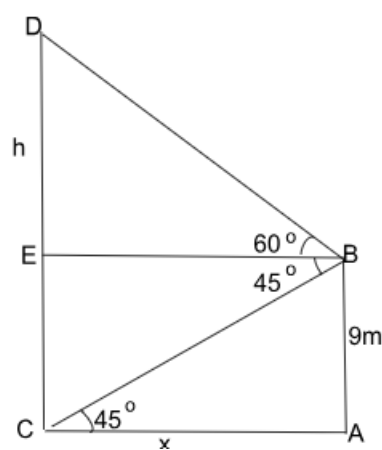
29.	<table border="1"> <thead> <tr> <th>Class</th> <th>x</th> <th>frequency(f)</th> <th><math>u = \frac{x - 25}{10}</math></th> <th>fu</th> </tr> </thead> <tbody> <tr> <td>0-10</td> <td>5</td> <td>6</td> <td>-2</td> <td>-12</td> </tr> <tr> <td>10-20</td> <td>15</td> <td>10</td> <td>-1</td> <td>-10</td> </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><math>\Sigma f = 50</math></td> <td></td> <td><math>\Sigma fu = 7</math></td> </tr> </tbody> </table>	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 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																																	
		$\Sigma f = 50$		$\Sigma fu = 7$																																	
$\text{Mean} = 25 + 10 \times \left(\frac{7}{50}\right)$ $= 26.4$	1 1/2																																				

30 (A).	<p>(i) <math>\triangle OAP \cong \triangle OBP</math>  <math>\angle APO = \angle BPO</math>  Or OP bisects <math>\angle P</math></p> <p>(ii) <math>\triangle AQP \cong \triangle BQP</math>  <math>\Rightarrow AQ = BQ</math> and <math>\angle AQP = \angle BQP</math>  AB is a straight line  therefore <math>\angle AQP = \angle BQP = 90^\circ</math>  Hence OP is right bisector of AB</p>	1 1 1
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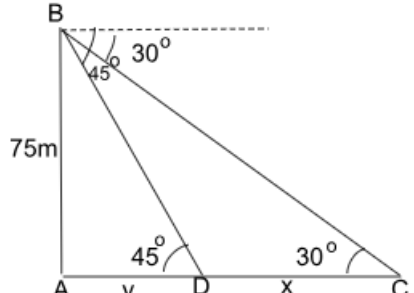
**OR**

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

<p><b>35 (A).</b></p>	 <p>Let AB be the building and CD be the tower.  Here <math>\tan 60^\circ = \sqrt{3} = \frac{h}{x}</math>  <math>\Rightarrow h = x\sqrt{3} \dots \dots \dots (i)</math>  <math>\tan 45^\circ = \frac{9}{x} = 1</math>  <math>\Rightarrow x = 9 \text{ m} \dots \dots \dots (ii)</math> ( Distance between tower and building)</p> <p>Solving (i) &amp; (ii) to get <math>h = 9 \times 1.732 = 15.588\text{m}</math></p> <p>Therefore, the height of the tower = <math>h + 9 = 24.588 \text{ m}</math>.</p>	<p><b>1 mark for correct figure</b></p> <p>1  <math>\frac{1}{2}</math>  1  <math>\frac{1}{2}</math>  <math>\frac{1}{2}</math></p>
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**OR**

<p><b>35 (B).</b></p>	 <p>Let AB be the light house and C &amp; D be positions of ships.  <math>\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{75}{x+y}</math>  <math>\Rightarrow x + y = 75\sqrt{3} \dots \dots \dots (i)</math></p> <p><math>\tan 45^\circ = 1 = \frac{75}{y}</math>  <math>\Rightarrow y = 75 \dots \dots \dots (ii)</math></p> <p>Solving (i) &amp; (ii) to get <math>x = 75(\sqrt{3} - 1)</math>  <math>\Rightarrow x = 75 \times 0.732</math>  <math>= 54.9 \text{ m}</math></p> <p>Distance between the ships is <math>54.9 \text{ m}</math></p>	<p><b>1 mark for correct figure</b></p> <p>1  <math>\frac{1}{2}</math>  1  <math>\frac{1}{2}</math>  1</p>
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**Section E**

<p><b>36.</b></p>	<p>(i) Number of students who do not prefer to walk = <math>200 - 120 = 80</math>  P (selected student doesn't prefer to walk) = <math>\frac{80}{200}</math> or <math>\frac{2}{5}</math></p>	<p><math>\frac{1}{2}</math>  <math>\frac{1}{2}</math></p>
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	<p>(ii) Total number of students who prefer to walk or use bicycle = <math>120 + 50</math>  <math>= 170</math></p> <p>P (selected student prefers to walk or use bicycle) = <math>\frac{170}{200}</math> or <math>\frac{17}{20}</math></p> <p>(iii) (A) 50% of walking students who used bicycle = 60  Number of students who already use bicycle = 50  P (selected student uses bicycle) = <math>\frac{110}{200}</math> or <math>\frac{11}{20}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(B) Number of students who preferred to be dropped by car  <math>= 200 - (120 + 50 + 20)</math>  <math>= 10</math> students</p> <p>P (selected student is dropped by car) = <math>\frac{10}{200}</math> or <math>\frac{1}{20}</math></p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p>
<b>37.</b>	<p>(i) 1 and 4</p> <p>(ii) <math>x = 5/2</math></p> <p>(iii) (A) At <math>x = 5/2</math>, <math>p(x) = 2.25</math>  Therefore, <math>h = 0.10 + 2.25 = 2.35m</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(B) <math>-x^2 + 5x - 4 = 2</math>  <math>x^2 - 5x + 6 = 0</math>  <math>(x - 2)(x - 3) = 0</math>  <math>\Rightarrow x = 2</math> and <math>x = 3</math>  Therefore, required points are (2,0) and (3,0)</p>	<p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>
<b>38.</b>	<p>(i) <math>l^2 = (1.2)^2 + (0.5)^2</math>  <math>= 1.44 + 0.25</math>  <math>\Rightarrow l = \sqrt{1.69} = 1.3cm</math></p> <p>(ii) Curved surface area of sharpened part  <math>= \pi \times 0.5 \times 1.3</math>  <math>= (0.65 \pi) cm^2</math></p> <p>(iii) (A) Total surface area of pencil  <math>= \text{CSA of cylinder} + \text{CSA of cone} + \text{area of base circle}</math>  <math>= \pi \times 0.5 \times 0.5 \times 21 + 0.65 \pi + \pi \times (0.5)^2</math>  <math>= (5.25 + 0.65 + 0.25)\pi</math>  <math>= (6.15 \pi) cm^2</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(B) Length of cylindrical part of shortened pencil  <math>= (21 - 8.2) cm = 12.8 cm</math>  So, volume of cylindrical part of shortened pencil  <math>= \pi \times 0.5 \times 0.5 \times 12.8</math>  <math>= (3.2 \pi) cm^3</math></p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p> <p><b>1</b></p> <p><math>\frac{1}{2}</math></p>