



**COMMON PRE-BOARD EXAMINATION**  
**MATHEMATICS (BASIC)–Code No. 241**  
**CLASS-X-(2025-26)**



**SET: 3**

**Time allowed: 3 Hrs.**

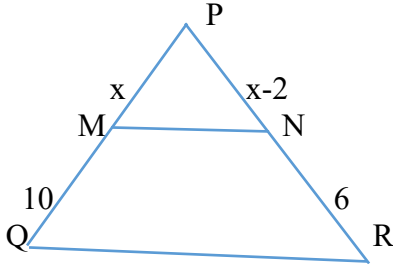
**Maximum Marks: 80**

**General Instructions:**

Read the following instructions very carefully and follow them:

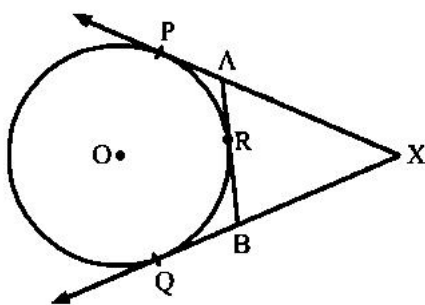
1. This Question Paper has 5 Sections A - E.
2. Section **A** has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section **B** has 5 questions carrying 02 marks each.
4. Section **C** has 6 questions carrying 03 marks each.
5. Section **D** has 4 questions carrying 05 marks each.
6. Section **E** has 3 Case Based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = \frac{22}{7}$ , wherever required if not stated.

<b>Section A</b>														
1.	$7\sec^2x - 7\tan^2x$ equal to a) 1 b) -7 c) 7 d) none of these	1												
2.	Which is the modal class ? <table border="1" style="margin: 10px auto; border-collapse: collapse;"><thead><tr><th>Class</th><th>0-10</th><th>10-20</th><th>20-30</th><th>30-40</th><th>40-50</th></tr></thead><tbody><tr><td>Frequency</td><td>17</td><td>11</td><td>21</td><td>23</td><td>18</td></tr></tbody></table> a) 10-20 b) 20-30 c) 30-40 d) 40-50	Class	0-10	10-20	20-30	30-40	40-50	Frequency	17	11	21	23	18	1
Class	0-10	10-20	20-30	30-40	40-50									
Frequency	17	11	21	23	18									
3.	The distance between ( a, 0 ) and ( 0, a ) is	1												

	a) 0 b) 2a c) $\sqrt{2} a$ d) 4a	
4.	What is k if the quadratic equation $5x^2 - 2x + k = 0$ has equal roots ?  a) 5 b) $1/5$ c) $-5$ d) $-1/5$	1
5.	In an AP, $a_{17} - a_{12} = 45$ . Find d.  a) $-9$ b) $45/27$ c) $-45/27$ d) 9	1
6.	Find k if $5k+1$ , $8k-3$ and $9k+7$ are in AP.  a) 7 b) 1 c) 2 d) $-7$	1
7.	The shadow of a pole of height 10 m is 16 m. At the same time, what is the length of shadow of a tower of 25 m high ?  a) 30 m b) 35m c) 40 m d) 45 m	1
8.	In the given figure, $MN \parallel QR$ . If $PM = x \text{ cm}$ , $MQ = 10 \text{ cm}$ , $PN = x - 2 \text{ cm}$ and $NR = 6 \text{ cm}$ , then the value of x is    a) 5cm b) 4 cm c) 6 cm d) 3 cm	1
9.	The ratio in which the line segment joining $A(1,4)$ and $B(2,-7)$ is divided by the x-axis	1

	<p>is</p> <p>a) 7:4</p> <p>b) 3: 2</p> <p>c) 2: 3</p> <p>d) 4: 7</p>	
10.	<p>Which among the following line is parallel to the line <math>2x - 3y = 6</math> ?</p> <p>a) <math>4x - 6y = 12</math></p> <p>b) <math>4x + 6y = 12</math></p> <p>c) <math>4x - 6y = 3</math></p> <p>d) <math>4x + 6y = 3</math></p>	1
11.	<p>The length of the tangent from a point A at a distance 5 cm from the centre of the circle is 4 cm. The radius of the circle is</p> <p>a) 9 cm</p> <p>b) 1 cm</p> <p>c) 6 cm</p> <p>d) 3 cm</p>	1
12.	<p>TP and TQ are tangents to a circle with centre O from an external point T. <math>\angle POQ = 115^\circ</math>, then <math>\angle PTQ</math> is</p> <p>a) <math>75^\circ</math></p> <p>b) <math>35^\circ</math></p> <p>c) <math>65^\circ</math></p> <p>d) <math>55^\circ</math></p>	1
13.	<p>The length of arc of a circle with central angle <math>90^\circ</math> is 11 cm. The radius of the circle is</p> <p>a) 3.5 cm</p> <p>b) 7 cm</p> <p>c) 14 cm</p> <p>d) 10.5 cm</p>	1
14.	<p>In a class of 40 students, 25 are girls. One student is chosen at random. The probability that the student is a boy is</p> <p>a) <math>\frac{3}{8}</math></p> <p>b) <math>\frac{5}{8}</math></p> <p>c) <math>\frac{1}{2}</math></p> <p>d) <math>\frac{3}{4}</math></p>	1
15.	<p>Which among the following can not be the probability of any event ?</p> <p>a) 0</p> <p>b) 1</p>	1

	c) $\frac{3}{5}$ d) $\frac{5}{3}$	
16.	Which among the following is the relation between mean, median and mode ?  a) $3 \text{ Mode} = 2 \text{ Median} + \text{Mean}$ b) $3 \text{ Mean} = 2 \text{ Mode} + \text{Median}$ c) $3 \text{ Median} = \text{Mode} + 2 \text{ Mean}$ d) $3 \text{ Median} = 2 \text{ Mode} + \text{Mean}$	1
17.	Which is the quadratic polynomial whose zeroes are $-5$ and $-1$ ?  a) $x^2 - 6x + 5$ b) $x^2 - 6x - 5$ c) $x^2 + 6x + 5$ d) $x^2 + 6x - 5$	1
18.	How many zeroes does the number $24 \times 25 \times 17 \times 15 \times 2^3 \times 5^2$ end with ?  a) 6 b) 5 c) 4 d) 3	1
	<b>Assertion - Reason</b>  <b>For questions 19 and 20, choose the correct option from the following :</b> a) Both A and R are true and R is the correct explanation of A b) Both A and R are true and R is not the explanation of A c) A is true but R is false d) A is false but R is true	
19.	<b>Assertion ( A ) :</b> If $\Delta ABC$ and $\Delta PQR$ are congruent triangles, then they are similar triangles.  <b>Reason ( R ) :</b> All congruent triangles are similar, but all similar triangles need not be congruent.	1
20.	<b>Assertion ( A ) :</b> In the given figure, $XA + AR = XB + BR$ , where XP , XQ and AB are tangents .	1



**Reason ( R ) :** A tangent to a circle is perpendicular to the radius through the point of contact.

### Section B

21. Prove that tangents from an external points to a circle are equal in length. 2

22. A) One zero of the polynomial  $(5k - 2)x^2 - 3x + 3k$  is reciprocal of the other, find the value of k. 2

**OR**

B) If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $2x^2 - 3x + 6$ , then evaluate  $2\alpha + 2\beta + \alpha\beta$ .

23. A) If  $\sin(A + B) = \frac{\sqrt{3}}{2}$  and  $\sin(A - B) = \frac{1}{2}$ , find A and B. 2

**OR**

B) If  $4 \tan\theta = 3$ , evaluate  $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta}$ .

24. Sum of a number and its reciprocal is  $\frac{10}{3}$ . Find the number. 2

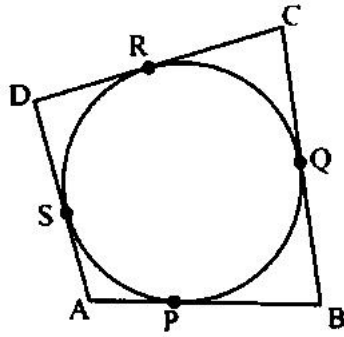
25.  $\text{HCF}(a, 80) = 40$  and  $\text{LCM}(a, 80) = 120$ . Find  $a$ . 2

### Section C

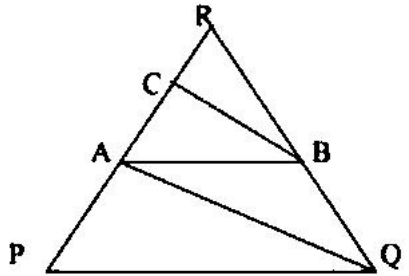
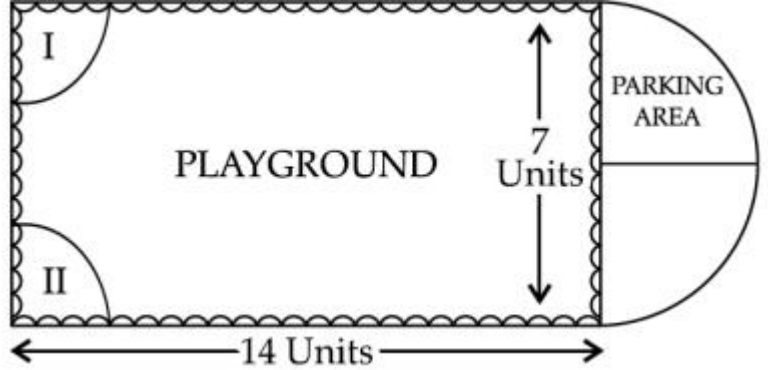
26. Find the median of the following data : 3

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	7	6	9	10	8	40

27. ABCD is a quadrilateral circumscribing a circle. Prove that  $AB + CD = BC + AD$ . 3



28	Given $\sqrt{2}$ is irrational. Hence prove $9 - 7\sqrt{2}$ is irrational	3
29	A fraction is such that if the numerator is multiplied by 2 and the denominator is increased by 2, we get $5/4$ . If the numerator is increased by 1 and the denominator is doubled, we get $1/2$ . Find the fraction.	3
30	A) The 18 <sup>th</sup> term of an AP is 63 and the 11 <sup>th</sup> term is 42. Find its 25 <sup>th</sup> term.  <b>OR</b>  B) Which term of the AP 8, 14, 20, ..... will be 72 more than the 41 <sup>st</sup> term ?	3
31	A) Evaluate using trigonometric table : $\frac{3\sin^2 60^\circ + 5\tan^2 45^\circ - \cos 60^\circ}{2\cos^2 30^\circ + \sin 30^\circ + \tan^2 60^\circ}$ .  <b>OR</b>  Prove that $(\sec\theta - \tan\theta)^2 = \frac{1-\sin\theta}{1+\sin\theta}$	3
	<b>Section D</b>	
32.	A man standing on the deck of a ship 10 m high, observes the angle of elevation of the top of a hill as $60^\circ$ and the angle of depression of the base of the hill as $30^\circ$ . Find the height of the hill.	5
33.	A) A toy is in the form of a solid cylinder with two hemispherical ends. The radii of cylinder and hemisphere being 7 cm. The total length of the toy is 24 cm. Find the volume and surface area of the toy.  <b>OR</b>  B) A cylindrical vessel of radius 14 cm and height 20 cm is full of water. An iron solid in the shape of a cone surmounted by a hemisphere is dropped in the water so that certain amount of water flows out. The common radii of cone and hemisphere is 7 cm and height of cone is 10 cm. What is the volume of water remaining in the cylindrical vessel ?	5

34.	<p><b>Prove that:</b> In a triangle, if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the two sides are divided in the same ratio. Using the above result, prove the following:</p>  <p>In the figure, AB parallel to PQ and BC parallel to AQ. Prove that <math>AR^2 = PR \cdot CR</math>.</p>	5
35	<p>A) A train covers 360 km at a uniform speed, If the speed had been 5 km/h more, it would have taken 1 hour less for the journey. Find the speed of the train.</p> <p style="text-align: center;"><b>OR</b></p> <p>Solve for x: <math>\frac{1}{x+1} + \frac{3}{5x+1} = \frac{5}{x+4}</math>, where <math>x \neq -1, -4, -\frac{1}{5}</math>.</p>	5
<b>Section E</b>		
36	<p><b>Case Study 1:</b></p> <p>Governing council of a local public development authority decided to build a playground on the valley of a hill which will have adequate space for parking.</p> <p>After survey it was decided to build a rectangular play ground with a semi circular parking area at one end . The length and breadth of play grounds are 14 and 7 units respectively. There are two quadrants of radius 2 units each at both corners of one end to reserve for VIP seats.</p>  <p>Based on the above information, answer the following questions :</p> <p>(i) What is the area of the semi circular parking space ?</p>	

	<p>(ii) How much area is reserved for VIP seats ?</p> <p>(iii) A) What is the total perimeter of the rectangular field and parking section ?</p> <p style="text-align: center;"><b>OR</b></p> <p>B) What is the total area of the play ground including VIP section and parking space ?</p>	<p>1</p> <p>1</p> <p>2</p>
<p>37.</p>	<p><b>Case Study 2:</b></p> <p>All of the persons know that smoking is injurious to health. So, some college students decided to start a campaign. To raise social awareness about hazards of smoking, they started NO SMOKING campaign. Some students were asked to prepare banners in the shape of triangle which is shown in the figure</p> <div style="text-align: center;"> </div> <p>Based on the above information, answer the following questions :</p> <p>(i) Find the coordinates of Q and R</p> <p>(ii) Find the mid point of QR</p> <p>(iii) A) Find a point on X- axis which is equidistant from Q and R</p> <p style="text-align: center;"><b>OR</b></p> <p>B) Find the area of triangle PQR</p>	<p>1</p> <p>1</p> <p>2</p>
<p>27.</p>	<p><b>Case Study 3:</b></p> <p>Anu and Saj decided to have game with numbers. Anu wrote numbers from 5 to 40 on cards such a way that each number on different cards. She asked Saj to choose a number. He chose a card randomly from the cards of numbers.</p>	



Based on the following information, answer the following questions :

(i) What is the probability that the card drawn contains an even number ?

(ii) What is the probability that the drawn card contains a number which is a perfect square ?

(iii) A) What is the probability that the drawn card contains a prime number ?

**OR**

B) What is the probability that the drawn card contains a number which is a multiple of 3 or 4.

1

1

2