

PRE-BOARD EXAMINATION

Class - X Session 2022-23

Subject - Mathematics (Basic)

Time Allowed: 3 Hours

Maximum Marks: 80

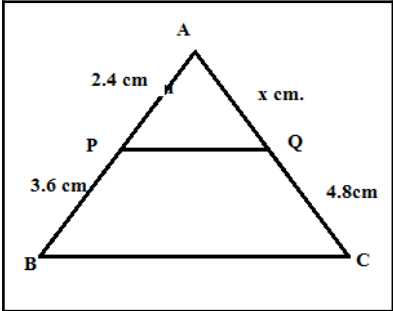
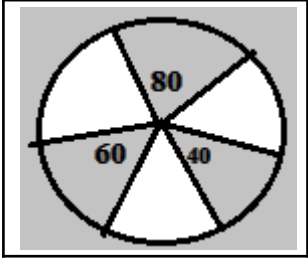
General Instructions:

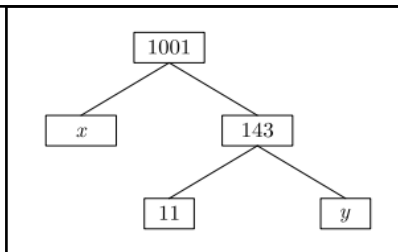
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 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 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 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 $\pi = 22/7$ wherever required if not stated

Section A

Section A consists of 20 questions of 1 mark each.

Q1.	If two positive integers a and b are written as $a = x^4 y^2$ and $b = x^2 y^3$; where a and b are prime numbers, then find the HCF(a,b). (a) xy^3 (b) $x^2 y^2$ (c) $x^3 y^2$ (d) $x^4 y^3$	1
Q2.	On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$ of lines representing the given pair of linear equations $5x - 4y - 8 = 0$ and $7x + 6y - 9 = 0$ will be a)Coincident (b) Parallel (c)Intersecting at exactly one point (d) Intersecting at exactly two points	1
Q3.	What will be the Discriminant of $x^2 + 5x + 5 = 0$ (a)D= -5 (b)D=5 (c)D =4 (d)D=0	1
Q4.	The decimal expansion of the rational number $\frac{14587}{1250}$ will terminate after (a) one decimal place (b) two decimal places (c) three decimal places (d) four decimal places	1
Q5.	If α and $\frac{1}{\alpha}$ are the zeroes of the polynomial $4x^2 - 2x + (k - 4)$, then the value of k. a) k=0 (b) k=6 (c) k=4 (d) k=8	1
Q6.	The perimeter of a triangle with vertices (0, 12), (0, 0) and (5, 0) is (a) 5 units (b) 17 units (c) 30 units (d) $(17 + \sqrt{5})$ units	1

Q7.	<p>If point P divides the line segment joining the points A(2,1) and B(6,5) in the ratio 1:3 , then find the coordinates of P.</p> <p>a) (12,8) (b)(3,2) (c)(5,4) (d)(20,16)</p>	1
Q8.	 <p>In the given figure if $PQ \parallel BC$ then the value of $x=...$</p> <p>a) 1.2 cm (b) 3.2cm (c) 1.6 cm (d) 3.4cm</p>	1
Q9.	<p>The value of $\sin^2 30^\circ - \cos^2 30^\circ$ is</p> <p>a) $-\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{3}{2}$ (d) $\frac{2}{3}$</p>	1
Q10.	<p>If ΔABC is right angled at C then value of $\cos(A + B)$ is</p> <p>(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$</p>	1
Q11.	<p>If $\sec A + \tan A = x$, then $\tan A = \dots\dots$</p> <p>(a) $\frac{2}{x}$ (b) $\frac{1}{2x}$ (c) $\frac{x^2-1}{2x}$ (d) $\frac{2x}{x^2-1}$</p>	1
Q12.	<p>Two parallel lines touch the circle at point A and B respectively. If area of the circle is 36π sq.cm, then AB=..</p> <p>a) 6 cm (b) 8cm (c) 10cm (d) 12 cm.</p>	1
Q13.	<p>A quadrilateral ABCD is drawn to circumscribe a circle . If AB =12 cm ,BC=16cm and CD=15 cm. then AD=.....</p> <p>a) 13 cm (b) 12cm (c) 11cm. (d) 10cm</p>	1
Q14.	<p>In the given figure, 3 sectors of a circle of radius 7 cm. making angles of 60° , 80° and 40° at the centre are shaded. The area of the shaded region in sq. cm. is</p> <p>a) 77 (b) 154 (c) 44 (d) 22</p> 	1
Q15.	<p>The least number which is a perfect square and is divisible by each of 16, 20 and 24 is</p> <p>(a) 240 (b) 1600 (c) 2400 (d) 3600</p>	1
Q16.		1



The values of x and y in the given figure are

- (a) 7, 13 (b) 13, 7
(c) 9, 12 (d) 12, 9

Q17. For an AP, if $a_{25} - a_{20} = 45$, then find the value of d.
a)14 (b)9 (c)5 (d)23

Q18. The distance of the point (-12,5) from the origin is
a)12 (b)5 (c)13 (d)169

Q19. **Assertion :** The HCF of two numbers is 5 and their product is 150, then their LCM is 30
Reason : For any two positive integers a and b, $HCF(a,b) \times LCM(a,b) = a \times b$
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

Q20. **Assertion :** The value of y is 6, for which the distance between the points P(2,-3) and Q(10,y) is 10.
Reason : Distance between two given points A(x₁, y₁) and B(x₂, y₂) is given,
$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true

Section B

Section B consists of 5 questions of 2 marks each.

Q21. For what value of k, $2x + 3y = 4$ and $(k+2)x + 6y = 3k + 2$ will have infinitely many solutions ?

Q22. In (Figure-1) $\angle D = \angle E$ and $\frac{AD}{DB} = \frac{AE}{EC}$, prove that ΔBAC is an isosceles triangle.

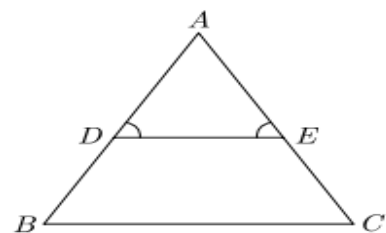
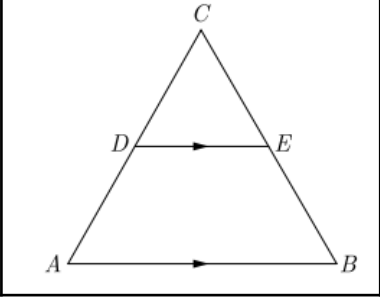
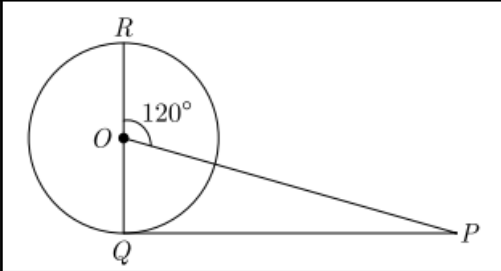
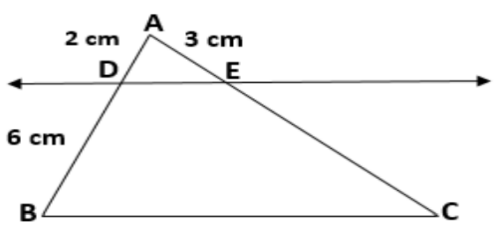


Fig-1

Or,

	<p>Fig-2</p> 		
	<p>In the given(figure-2) $\angle A = \angle B$ and $AD = BE$. Show that $DE \parallel AB$</p>		
<p>Q23.</p>	<p>What is the length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm ?</p>	<p>2</p>	
<p>Q24.</p>	<p>PQ is a tangent drawn from an external point P to a circle with centre O, QOR is the diameter of the circle. If $\angle POR = 120^\circ$, what is the measure of $\angle OPQ$?</p> 	<p>2</p>	
<p>Q25.</p>	<p>The perimeter of a sector of a circle of radius 5.2 cm is 16.4cm. Find the area of the sector.</p> <p style="text-align: center;">or,</p> <p>In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the area of sector formed by the arc.</p>	<p>2</p>	
Section C			
Section C consists of 6 questions of 3 marks each.			
<p>Q26.</p>	<p>Prove that $\sqrt{3}$ is irrational.</p>	<p>3</p>	
<p>Q27</p>	<p>A boat covers 32 km upstream and 36 km downstream in 7 hours. Also, it covers 40 km upstream and 48 km downstream in 9 hours. Find the speed of the boat in still water and that of the stream.</p> <p style="text-align: center;">Or,</p> <p>The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and the breadth is increased by 3 units. The area is increased by 67 square units if length is increased by 3 units and breadth is increased by 2 units. Find the perimeter of the rectangle.</p>	<p>3</p>	
<p>Q28.</p>	<p>If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then find the value of a and b .</p>	<p>3</p>	
<p>Q29.</p>	<p>Prove that : $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \sec\theta + \tan\theta$</p> <p style="text-align: center;">Or,</p>	<p>3</p>	

	Prove that : $(\cot \theta - \theta)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$	
Q30.	Prove that the tangents drawn at the ends of a diameter of a circle are parallel.	3
Q31.	Find the zeroes of the quadratic polynomial $5x^2 + 8x - 4$ and verify the relationship between the zeroes and the coefficients of the polynomial.	3
Section D		
Section D consists of 4 questions of 5 marks each.		
Q32.	A train covers a distance of 480 km at a uniform speed. If the speed had been 8 km/hr less, then it would have taken 3 hours more to cover the same distance. Find the original speed of the train. Or, Sum of the areas of two squares is 400 sq.cm. If the difference of their perimeters is 16 cm, find the sides of the two squares.	5
Q33.	Prove that If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. In the figure, find EC, if $\frac{AD}{DB} = \frac{AE}{EC}$ using the above theorem 	5
Q34.	In a circle of radius 21 cm. an arc subtends an angle of 60° at the centre. Draw a neat diagram for it and find (i) the length of the arc (ii) area of the sector formed by the arc (iii) area of the segment formed by the corresponding chord.	5
Q35.	An observer finds the angle of elevation of the top of the tower from a certain point on the ground as 30° . If the observer moves 20 m, towards the base of the tower, the angle of elevation of the top increase by 15° , find the height of the tower. Or, From a top of a building 100 m high the angle of depression of two objects are on the same side observed to be 45° and 60° . Find the distance between the objects.	5
Section E		
Case study based questions are compulsory.		
36.	Case Study – 1 Seating Capacity : The Fox Theater creates a “theater in the round” when it shows any of Shakespeare’s plays. The first row has 80 seats, the second row has 88, the third row has 96, and so on.	4

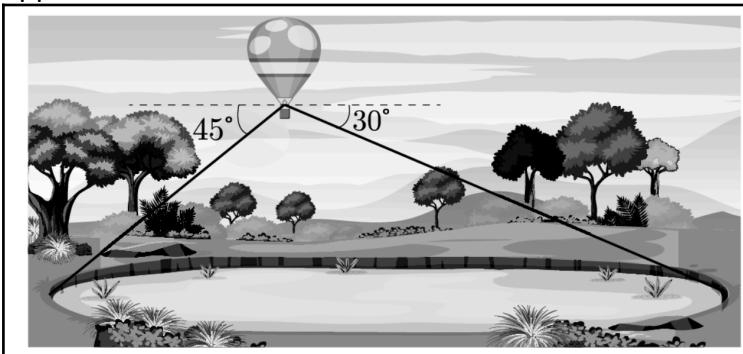


- (i) How many seats are in the 10th row? (1)
- (ii) How many seats are in the 25th row? (1)
- (iii) If there is room for 25 rows, how many chairs will be needed to set up the theatre? (2)

Q37.

Case Study – 2

Width of a Lake : The angle of depression to one side of a lake, measured from a balloon 300 meter above the lake as shown in the accompanying figure, is 45° . The angle of depression to the opposite side of the lake is 30° .



- (i) Find the width of the lake (1)
- (ii) Find the distance of the nearest side of the lake from the point lying just below the balloon on the lake.(1)
- (iii) Find the ground distance of balloon from sides of lake. (2)

Q38.

Case Study – 3

Morning assembly is an integral part of the school's schedule. Almost all the schools conduct morning assemblies which include prayers, information of latest happenings, inspiring thoughts, speech, national anthem, etc. A good school is always particular about their morning assembly schedule. Morning assembly is important for a child's development. It is essential to understand that morning assembly is not just about standing in long queues and singing prayers or national anthem, but it's something beyond just prayers. All the activities carried out in morning assembly by the

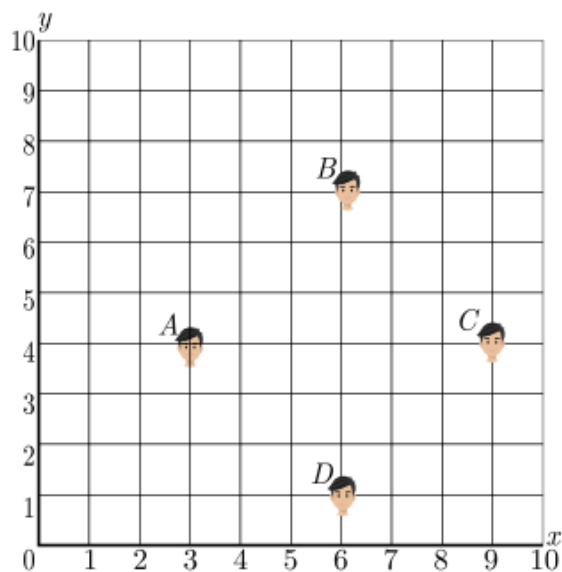
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school staff and students have a great influence in every point of life. The positive effects of attending school assemblies can be felt throughout life. Have you noticed that in school assembly you always stand in row and column and this make a coordinate system. Suppose a school have 100 students and they all assemble in prayer in 10 rows as given



below



- (i) What is the distance between A and B ? (1)
- (ii) What is the distance between C and D ? (1)
- (iii) What is the distance between A and C ? (2)