

PAST QUESTION PAPERS

FOR

CLASS – X

YEAR – 2018

MATHEMATICS

Full Marks – 80

Pass Marks – 20

Time : Three hours

Attempt all questions.

The figures in the right margin indicate full marks for the questions.

For Question nos. 1 to 5, write the letter corresponding to correct answer.

1. If $\sin(\theta + 55^\circ) = \cos(7 - 5^\circ)$, then the value of θ is : 1
(A) 5° (B) 10°
(C) 20° (D) 25°
2. Area of a circle is 154cm^2 , its perimeter in cm is 1
(A) 22 (B) 44
(C) 77 (D) 88
3. The line segment joining the points $(-2, -3)$ and $(5, 6)$ is divided by the x-axis in the ratio : 1
(A) 3 : 2 (B) 2 : 3
(C) 2 : 1 (D) 1 : 2
4. $x^n + a^n$ is divisible by $x + a$ only when n is : 1
(A) even (B) odd
(C) prime (D) composite
5. If D, E, F, are respectively the mid - points of the sides BC, CA, AB of a ΔABC , then the ratio of the area of ΔDEF to the area of ΔABC is : 1
(A) 1 : 2 (B) 1 : 3
(C) 1 : 4 (D) 1 : 6
6. Find the canonical decomposition of 3528. 1
7. State division algorithm for polynomials. 1
8. What is meant by a sequence ? 1
9. Find the value of $\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ$. 1

10. Write the statement of Factor Theorem 1
11. Define a random experiment. 1
12. If two events A and B are such that $P(A) + P(B) = 1$ write $P(B)$ in terms of $P(A)$. 1
13. Write down the formula for the area of a sector of a circle in terms of the radius and the arc length. 1
14. Establish the formula $S_n = \frac{n}{2}[2a + (n-1)d]$ for the sum of the first n terms of an AP. 2
15. When a polynomial $p(x)$ is divided by $3x - 1$, the quotient and remainder are $x^2 - 3x + 2$ and 5 respectively. Find $p(x)$ 2
16. Write down the roots of the quadratic equation $ax^2 + bx + c = 0$. If $a + b + c = 0$, what are the roots of the equation $ax^2 + bx + c = 0$? 2
17. Show that any square number cannot be put in the form $4k + 2$. 2
18. A solid metallic cone is 24cm high and radius of its base is 6cm. If it is melted and recast into a solid sphere, find the radius of the sphere. 2
19. Prove that : $a^3 + b^3 - c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$ 3
20. If α and β are the roots of the equation $ax^2 + bx + b = 0$
 prove that $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} + \sqrt{\frac{b}{a}} = 0$ 3
21. Solve graphically 3
 $2x = 3y$
 $\frac{x}{6} + \frac{y}{4} = 1$
22. Prove that the lengths of the tangents drawn from an external point to a circle are equal. 3
23. Prove that : $(\cos \theta - \sin \theta)(\sec \theta - \cos \theta) = \frac{1}{\tan \theta + \cot \theta}$ 3
24. Given that p is the probability that a person aged x years will die in a year. If Mr. A is one of four persons all ages x years, find the probability that atleast one of the four persons will die in a year and Mr. A is the first person to die. 3
25. Prove that $|x + y| \leq |x| + |y|$ for every $x, y \in \mathbb{R}$ and hence deduce that
 $|x - y| \geq |x| - |y|$. 4

Or

Prove that :

(i) If $x, y, z \in \mathbb{R}$, $x \neq 0$ and $xy = xz$ then $y = z$.

(ii) $x \cdot 0 = 0$ for any $x \in \mathbb{R}$

26. Find the coordinates of the point which divides the line segment joining the points (x_1, y_1) and (x_2, y_2) internally in the ratio $m : n$.

27. A rectangular garden is of the same area as another which is $6m$ longer and $4m$ narrower. It is also of the same area as a third garden which is $8m$ longer and $5m$ narrower. Find the cost of fencing the garden at the rate of Rs. 500/- per metre. 4

28. Construct a pair of tangents to a circle of radius $2.5cm$ from an external point which is at a distance of $6cm$ from the centre of the circle. Write the steps of construction. 5

29. From the top of a house of height h , the angle of elevation and depression of the top and bottom of a tower are α and β respectively. Prove that the height of the tower is $h(1 + \tan \alpha \cot \beta)$.

30. The median the following distribution is 52.5. Find the value of x and y if the total frequency is 100. 5

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	2	5	x	12	17	20	y	9	7	4

31. State and prove Pythagoras Theorem. 6

32. From a cone of height $24cm$, a smaller cone is cut off by a plane parallel to the base. If the volumes of the cones are in the ratio $8 : 27$, find the height of the resulting frustum. 6