

2017-18

Mathematics

Class:-X

Time: 3Hrs

Marks: 80

General Instructions

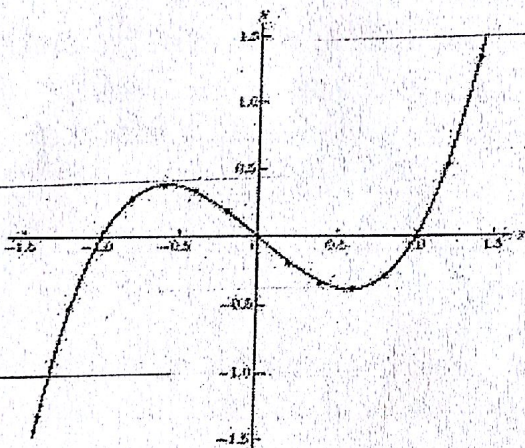
- All questions are compulsory.
- The question paper consists of 4 sections A, B, C and D.
Section A contains 6 questions of 1 mark each.
Section B contains 6 questions of 2 marks each.
Section C contains 10 questions of 3 marks each.
Section D consists of 8 questions of 4 marks each.
- 15 minutes time is allotted for reading the question paper.

Section A

- If $\sin \theta = \cos \theta$, find the value of θ , find the value of n
- If the numbers $n - 2$, $4n - 1$ and $5n + 2$ are in AP, find the value of n
- If $P(E) = 0.05$, what is the probability of "not E"?
- Write 70 as product of its prime factors.
- What is the modal class of the following frequency distribution?

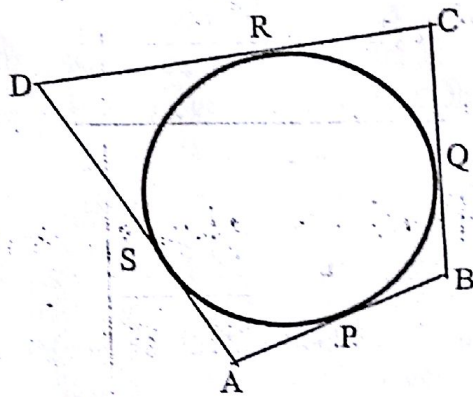
Age (in years)	0-10	10-20	20-30	30-40	40-50	50-60
Number of patients	16	13	6	11	27	18

- In the given figure, the graph of a polynomial $p(x)$ is given. Find the zeroes of the polynomial



SECTION B

7. ABC is an isosceles triangle, right angled at C. Prove that $AB^2 = 2 AC^2$.
8. Point P (5, -3) is one of the two points of trisection of the line segment joining the points A (7, -2) and B (1, -5) near to A. Find the coordinates of the other point of trisection.
9. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is some integer.
10. Solve using substitution method
 $x + y = 14$
 $x - y = 4$
11. If the quadratic equation $(k + 1)x^2 - 2(k-1)x + 1 = 0$ have real and equal roots then, find the value of k
12. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that $AB + CD = AD + BC$



SECTION C

13. A bag contains 5 blue balls and some red balls. If the probability of drawing a red ball from the bag is thrice that of a blue ball, find the number of red balls in the bag.
14. Given $15 \cot A = 8$, find $\sin A$ and $\sec A$
15. Prove that the line segment joining the points of contact of two parallel tangents of a circle passes through its Centre.
16. The mean of the following frequency distribution is 50. Find the missing frequencies f_1 and f_2 .

Classes	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	f_1	32	f_2	19	120

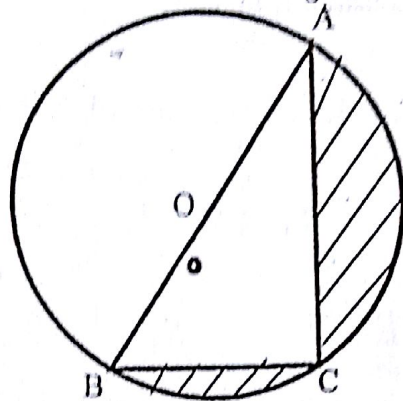
17. Prove that $3 + \sqrt{2}$ is an irrational number.
18. The sum of the squares of two consecutive odd numbers is 394. Find the numbers.
19. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (in Kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

Change the distribution to a more than type distribution and draw its ogive.

20. Check graphically whether the pair of equations $3x + 5y = 15$ and $x - y = 5$ is consistent. Also find the coordinates of the points where the graphs of equations meet the y axis.

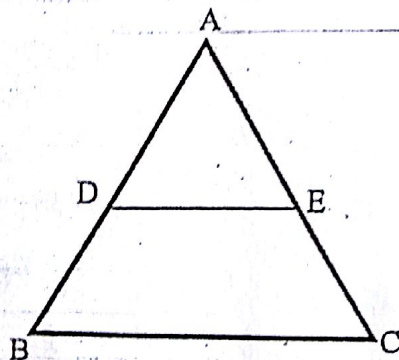
21. In the figure, O is the Centre of a circle such that diameter $AB = 13$ cm and $AC = 12$ cm. BC is joined. Find the area of the shaded region.



22. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2 .

SECTION D

23. For what value of n , are the n^{th} terms of two APs 63, 65, 67, _____ and 3, 10, 17, _____ equal?
24. If A (-4,8), B (-3, -4), C (0, -5) and D(5,6) are the vertices of a quadrilateral ABCD, find its area.
25. If $\operatorname{cosec} \theta + \cot \theta = p$ then prove that $\cos \theta = \frac{p^2 - 1}{p^2 + 1}$
26. Draw a triangle ABC with side $BC = 6$ cm, $AB = 5$ cm and $\angle ABC = 60^\circ$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.
27. 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. Using the above result prove that ΔABC is an isosceles triangle, if $DE \parallel BC$ and $BD = CE$



28. Rasheed got a playing top as his birthday present, which surprisingly had no colour on it. He donated this gift to a child in nearby orphanage. Before donating he wanted

to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 5 cm in height and the diameter of the top is 3.5 cm.

Find the area he must colour. (Take $\pi = \frac{22}{7}$). What value does Rasheed possess?

29. As observed from the top of a 75m high lighthouse from the sea level, the angles of depression of two ships are 30° and 45° . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

30. Find all the zeroes of the polynomial $x^4 + x^3 - 9x^2 - 3x + 18$, if it is given that two of its zeroes are $-\sqrt{3}$ and $\sqrt{3}$