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SAMPLE PAPER TEST 08 (2017-18)

SUBJECT: MATHEMATICS
CLASS : X

MAX. MARKS : 80
DURATION : 3 HRS

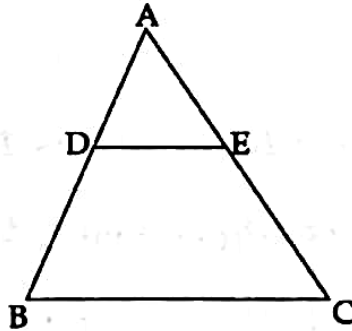
General Instruction:

- (i) All questions are compulsory.
- (ii) This question paper contains **30** questions divided into four Sections A, B, C and D.
- (iii) **Section A** comprises of 6 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 10 questions of **3 marks** each and **Section D** comprises of 8 questions of **4 marks** each.
- (iv) There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- (v) Use of Calculators is not permitted

SECTION – A

Questions 1 to 6 carry 1 mark each.

1. In the adjoining figure, $DE \parallel BC$. If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, find the value of x .



2. If a and b are two positive integers such that $a = bq + r$, where q and r are integers. If $a < b$, then find the value of q .
3. If the distance of the point $(4, a)$ from x -axis is half the distance from y -axis then find a .
4. If a pole 6m high throws shadow of $2\sqrt{3}$ m, then find the angle of elevation of the sun.
5. Find the nature of the roots of quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$
6. If the sum of first m terms of an AP is $2m^2 + 3m$, then what is its second term?

SECTION – B

Questions 6 to 12 carry 2 marks each.

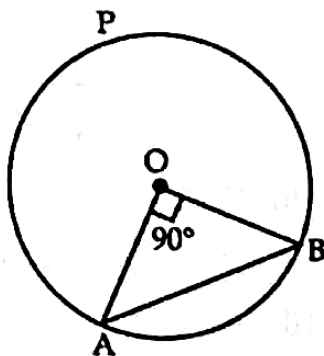
7. Three cards of spades are lost from a pack of 52 playing cards. The remaining cards were well shuffled and then a card was drawn at random from them. Find the probability that the drawn cards is of black colour.
8. All the three face cards of spades are removed from a well-shuffled pack of 52 cards. A card is then drawn at random from the remaining pack. Find the probability of getting (i) a black face card, (ii) a queen,

9. Find the HCF and LCM of 90 and 144 by method of prime factorisation.
10. Find the values of a and b for which the following pair of linear equations has infinitely many solutions: $3x - (a + 1)y = 2b - 1$; $5x + (1 - 2a)y = 3b$
11. ABC is a triangle and G(4, 3) is the centroid of the triangle. If A, B and C are the points (1, 3), (4, b) and (a, 1) respectively, find the values of a and b. Also find the length of side BC.
12. The 19th terms of an AP is equal to three times its 6th term. If its 9th term is 19, find the AP.

SECTION – C

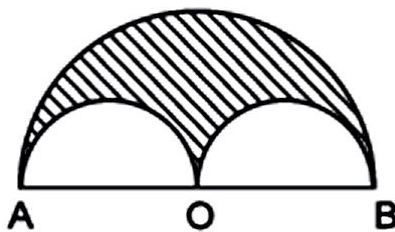
Questions 13 to 22 carry 3 marks each.

13. Prove that $\sqrt{5}$ is an irrational number and hence show that $2 + 3\sqrt{5}$ is also an irrational number.
14. ABC is a right triangle, right angled C. If p is the length of perpendicular from C to AB and a, b, c have usual meanings, then prove that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$.
15. Find the area of the major segment APB in adjoining figure, of a circle of radius 35 cm and $\angle AOB = 90^\circ$.



OR

In adjoining figure, a semicircle is drawn with O as centre and AB as diameter. Semicircles are drawn with AO and OB as diameters. If AB = 28 m, find the perimeter of the shaded region.



16. Evaluate:
$$\frac{5 \sin^2 30^\circ + \cos^2 45^\circ + 4 \tan^2 60^\circ}{2 \sin 30^\circ \cos 60^\circ + \tan 45^\circ}$$

OR

In an acute angled triangle ABC, if $\sin (A + B - C) = \frac{1}{2}$ and $\cos (B + C - A) = \frac{1}{2}$, find $\angle A$, $\angle B$ and $\angle C$.

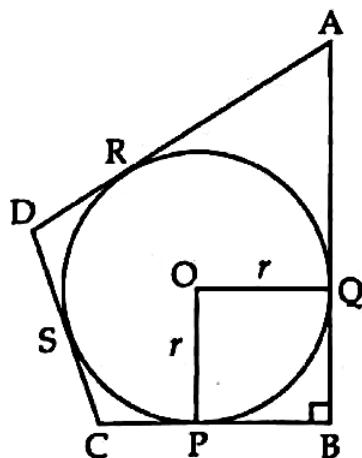
17. If two vertices of an equilateral triangle are (3, 0) and (6, 0), find the third vertex.

OR

The midpoints D, E and F of the sides AB, BC and CA of a triangle are (3, 4), (8, 9) and (6, 7) respectively. Find the coordinates of the vertices of the triangle.

18. If two zeroes of the polynomial $x^4 + 3x^3 - 20x^2 - 6x + 36$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeroes of the polynomial.

19. In the adjoining figure, a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^\circ$. If AD = 23 cm, AB = 29 cm and DS = 5cm, find the radius, r of the circle.



20. Water is flowing at the rate of 15 km/hr through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time will the level of the water in the pond rise by 21 cm?

OR

A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area and volume of the toy.

21. Draw the graphs of the equations $4x - y - 8 = 0$ and $2x - 3y + 6 = 0$. Also, determine the vertices of the triangle formed by the lines and x-axis.

22. Find median of the following data:

Class Interval	Frequency
130 – 139	4
140 – 149	9
150 – 159	18
160 – 169	28
170 – 179	24
180 – 189	10
190 – 199	7

SECTION – D

Questions 23 to 30 carry 4 marks each.

23. While boarding an aeroplane, a passenger got hurt. The pilot showing promptness and concern, made arrangements to hospitalize the injured and so the plane started late by 30 minutes. To reach the destination, 1500 km away in time, the pilot increased the speed by 100 km/hr. Find the original speed of the plane. What values depicted from the statement?

24. Draw a pair of tangents to a circle of radius 3 cm which are inclined at an angle of 60° to each other.

25. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high, find the height of the building.

OR

The angles of depression of two ships from the top of a lighthouse and on the same side of it are found to be 45° and 30° . If the ships are 200 m apart, find the height of the lighthouse.

26. Prove that “The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.”

OR

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

27. How many terms of the AP $-6, \frac{-11}{2}, -5, \dots$ are needed to give the sum -25 ? Explain the double answer.

28. An open metal bucket is in the shape of a frustum of a cone, mounted on a hollow cylindrical base made of the same metallic sheet. The diameters of the two circular ends of the bucket are 45 cm and 25 cm, the total vertical height of the bucket is 40 cm and that of the cylindrical base is 6 cm. Find the area of the metallic sheet used to make the bucket, where we do not take into account the handle of the bucket. Also, find the volume of water the bucket can hold.

29. Prove that: $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$

OR

Prove that: $\frac{1}{\operatorname{cosec} A - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{\operatorname{cosec} A + \cot A}$

30. The mean of the following frequency distribution is 62.8 and the sum of all the frequencies is 50. Find the missing frequencies f_1 and f_2 .

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
Frequency	5	f_1	10	f_2	7	8