MATHEMTICS - STANDARD

Self Assessment Paper 5

Section 'A'

Q 1- Q 10 are multiple choice questions. Select the most appropriate answer from the given options.

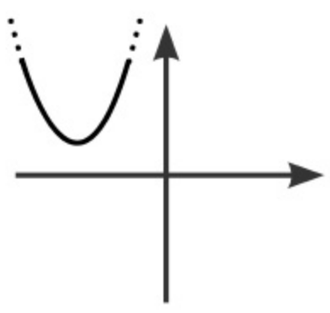
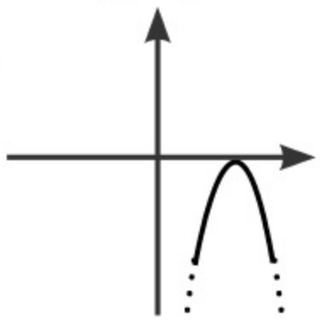
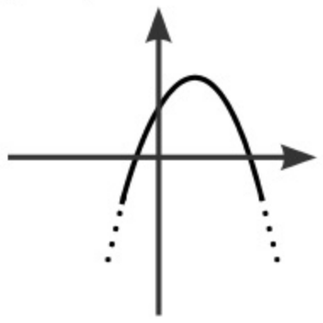
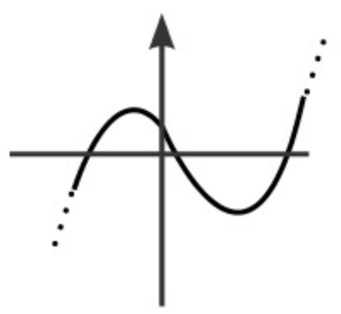
1. Decimal number 0.0875 in rational form is denoted by

(a) $\frac{875}{10^3}$ **(b)** $\frac{875}{10^4}$ **(c)** $\frac{8750}{10^2}$ **(d)** $\frac{875}{10^5}$

2. $5-\sqrt{3}$ is a

(a) composite number **(b)** rational number **(c)** irrational number **(d)** none of these

3. Which of the following is not the graph of a quadratic polynomial?

(a)  **(b)**  **(c)**  **(d)** 

4. The pair of equations $y = 0$ and $y = -7$ has :

(a) one solution **(b)** two solutions

(c) infinitely many solutions **(d)** no solution

5. A line intersects the y-axis and x-axis at the points P and Q respectively. If $(2, -5)$ is the mid-point of PQ, then the coordinates of P and Q are :

(a) P $(0, -10)$, Q$(4, 0)$ **(b)** P $(-10, 0)$, Q $(0, 4)$ **(c)** P $(0, -10)$, Q $(0, 4)$ **(d)** P $(-10, 0)$, Q $(4, 0)$

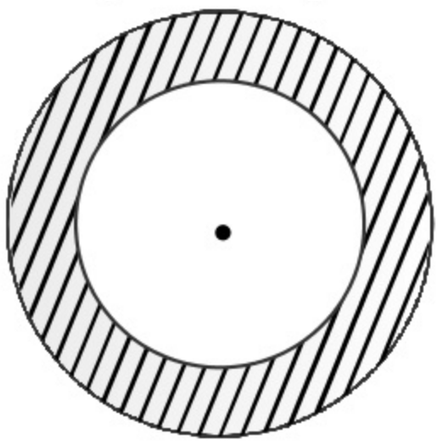
6. A circle touches all the four sides of a quadrilateral ABCD. Then AB + CD is equal to

(a) AD – BC **(b)** BC – AD **(c)** AD + BC **(d)** $(AD + BC)^2$

7. If a tower 30 m high, casts a shadow $10\sqrt{3}$m long on the ground, then angle of elevation of Sun is :

(a) 60^o **(b)** 30^o **(c)** 90^o **(d)** 45^o

8. Two coins of diameter 2 cm and 4 cm respectively are kept one over the other as shown in the figure, then the area of the shaded ring shaped region in square cm is



(a) 3π sq cm **(b)** 4π sq cm **(c)** 2π sq cm **(d)** 5π sq cm

9. A right circular cylinder of radius r cm and height h cm (where $h > 2r$) just encloses of sphere of diameter :

(a) r cm **(b)** $2r$ cm **(c)** h cm **(d)** $2h$ cm

10. A bag contains 3 red and 5 black ball. A ball is drawn at random from the bag. The probability that the drawn ball is not red is :

(a) $\frac{1}{8}$ **(b)** $\frac{3}{8}$ **(c)** $\frac{5}{8}$ **(d)** 1

(11-15) Fill in the blanks.

11. Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after what time they will toll together in ..... .

12. Aruna has only ₹ 1 and ₹ 2 coins with her. If the total number of coins that she has is 50 and the amount of money with their is ₹ 75, then the number of ₹ 1 and ₹ 2 coins are, respectively ..... and ..... .

AI **13.** The roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ are ..... and ..... .

OR

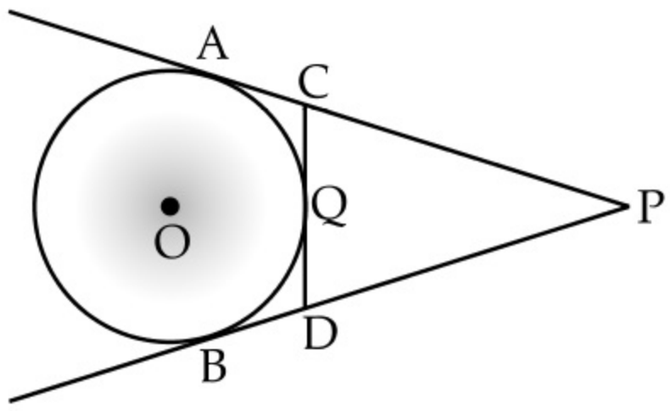
The value of p, for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other is ..... .

14. If the sum of first n terms of an A.P. is n^2 then its 10^{th} term equals to ..... .

15. ABC is an isosceles triangle right angled at C with AC = 4 cm. The length of AB is ..... .

(16-20) Answer the following

16. In the given figure, PA and PB are tangents to the circle from an external point P. CD is another tangent touching the circle at Q. If PA = 12 cm, QC = DQ = 3 cm, then find PC + PD.



17. A thin wire is in the shape of a circle of radius 77 cm. It is bent into a square. Find the side of the square $\left(\text{Taking}, \pi = \frac{22}{7}\right)$

18. A solid sphere of radius r is melted and recast into the shape of a solid cone of height r. Find the radius of the base of a cone.

OR

The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3, find the ratio of their volumes.

19. If the distances of P(x, y) from A(5, 1) and B $(-1, 5)$ are equal, then prove that $3x = 2y$

20. What is abscissa of the point of intersection of the "Less than type" and of the "More than type" cumulative frequency curve of a grouped data ?

Section 'B'

21. Prove that $\sqrt{2}$ is an irrational number.

22. Prove that the tangents drawn at the end points of a chord of a circle make equal angles with the chord.

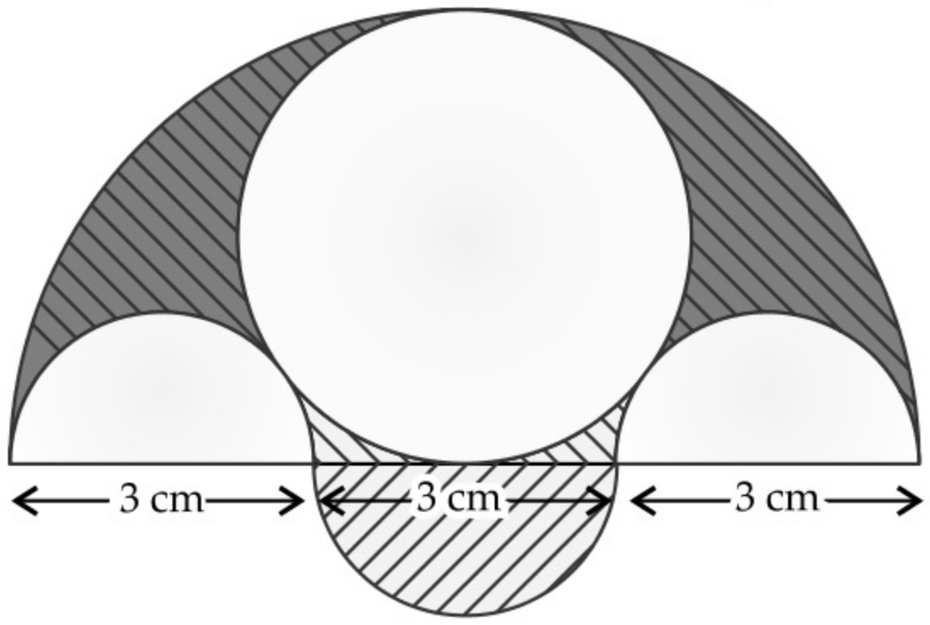
23. Sonu walks on side of road for jogging. He passes through the foot of the tower, two points C and D are at distances of 4 m and 16 m from the foot respectively. If the angles of elevation from two points name C and D to the top of the tower are complementary, then find the height of the tower.

24. Evaluate : $\tan^2 30° \sin 30° + \cos 60° \sin^2 90° \tan^2 60° - 2 \tan 45° \cos^2 0° \sin 90°$

OR

AI If $a \cos\theta + b \sin\theta = m$ and $a \sin\theta - b \cos\theta = n$, prove that $m^2 + n^2 = a^2 + b^2$

25. Three semicircles each of diameter are 3 cm, a circle of diameter 4.5 cm and a semicircle of radius 4.5 cm are drawn in the given figure. Find the area of the shaded region.



OR

Two spheres of same metal weigh 1 kg and 7 kg. The radius of the smaller sphere is 3 cm. The two spheres are melted to form a single big sphere. Find the diameter of the new sphere.

26. Two friends are playing a game with a die. One of them throws a die twice. Find the probability that

(i) 5 will come up at least once.

(ii) 5 will not come up either time.

Section 'C'

27. Obtain all other zeroes of the polynomial $9x^4 - 6x^3 - 35x^2 + 24x - 4$, if two of its zeroes are 2 and – 2.

28. On a holiday, Rishi went to ride on motor boat. He enjoyed alot. He asked to boat's man about the working of motor boat before riding on it. He replied that it can travel 30 km upstream and 28 km downstream in 7 hours while 21 km upstream and return in 5 hours. Rishi wants to find the speed of the boat in still water and the speed of the stream.

AI 29. If the equation $(1 + m^2)\, x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots then show that $c^2 = a^2\,(1 + m^2)$.

OR

The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{29}{20}$. Find the original fraction.

30. How many terms of the Arithmetic Progression 45, 39, 33, ... must be taken so that their sum is 180? Explain the double answer.

OR

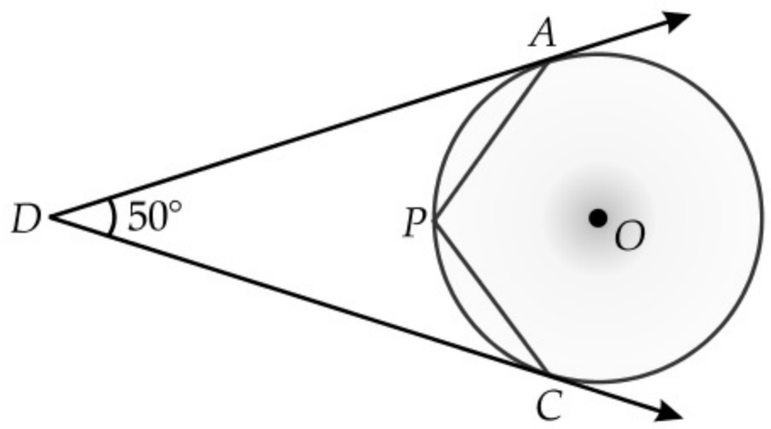
If the m^{th} term of an A.P. is $\frac{1}{n}$ and n^{th} term is $\frac{1}{m}$, then show that its $(mn)^{\text{th}}$ term is 1.

31. Two trees of height a and b are p metre apart.

(i) Prove that the height of the point of intersection of the lines joining the top of each tree to the foot of the opposite trees is given by $\frac{ab}{a+b}$ m.

(ii) Which mathematical concept is used in this problem ?

32. In the given figure, O is the centre of the circle. Determine $\angle APC$, if DA and DC are tangents and $\angle ADC = 50°$.



33. If $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$, prove that $x^2 + y^2 = 1$.

34. Draw a 'more than ogive' for the following data :

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	5	9	10	12	8	7	5	4

OR

Calculate the average daily income (in ₹) of the following data about men working in a company :

Daily income (in ₹)	< 100	< 200	< 300	< 400	< 500
Number of men	12	28	34	41	50

Section 'D'

35. Solve for x :

$$\frac{1}{2x-3}+\frac{1}{x-5}=1\frac{1}{9}, x \neq \frac{3}{2}, 5$$

AI **36.** If points A $(k + 1, 2k)$, B $(3k, 2k + 3)$ and C$(5k – 1, 5k)$ are collinear then find the value of k.

OR

The line segment joining the points A(2, 1) and B (5, – 8) is trisected at the points P and Q such that P is nearer to A. If P also lies on the line given by $2x – y + k = 0$, find the value of k.

37. Draw a line segment AB of length 7 cm. Taking A as centre, draw a circle of radius 3 cm and taking B as centre, draw another circle of radius 2 cm. Construct tangents to each circle from the centre of the other circle.

38. A man observes a car from the top of a tower, which in moving towards the tower with a uniform speed. If the angle of depression of the car changes from 30° to 45° in 12 minutes, find the time taken by the car now to reach the tower.

OR

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 increased by 15°, find the height of the tower.

39. In a hospital, used water is collected in a cylindrical tank of diameter 2 m and height 5 m. After recycling, this water is used to irrigate a park of hospital having length 25 m and breadth 20 m (provided no water is absorbed by land). If tank is filled completely then what will be the height of standing water used for irrigating the park. Write your views on recycling of water.

OR

A chord PQ of a circle of radius 10 cm subtends an angle of 60° at the centre of circle. Find the area of major and minor segments of the circle.

40. Draw "less than ogive" and "more than ogive" for the following distribution and hence find its median :

Class	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
Frequency	10	8	12	24	6	25	15