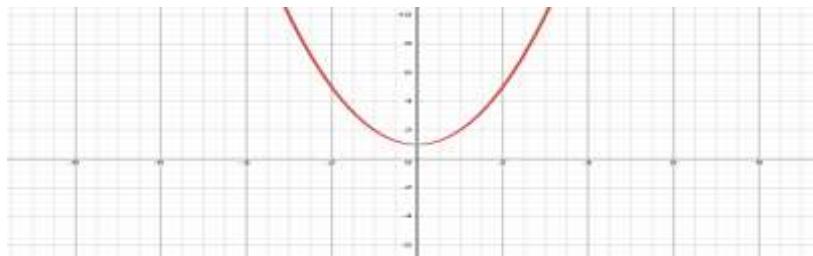


Section – A (20x1=20)

Q1. There are two pairs of natural numbers whose LCM is 78 and HCF is 13. The number are:

- (a) 13, 39 & 26, 78
- (b) 26, 39 & 13, 78
- (c) 13, 26 & 39, 78
- (d) 26, 78 & 13, 39

Q2. The graph of a quadratic polynomial is shown below. The nature of its roots is:



- (a) Two distinct real roots
- (b) Exactly one real root
- (c) Two equal real roots
- (d) No real roots

Q3. If $f(x) = ax^2 + bx + c$ has no real zeroes and $a + b + c = 0$, then

- (a) $c = 0$
- (b) $c > 0$
- (c) $c < 0$
- (d) data not sufficient

Q4. The pair of equations $y= 5$ and $y = 6$ has

- (a) one solution
- (b) two solutions
- (c) infinitely many solutions
- (d) no solution

Q5. For what value of k does the following pair of linear equations have infinitely many solutions? $(k-1)x + 2y = 3$ & $2x + (k-1)y = 3$

- (a) 1
- (b) 3
- (c) -1
- (d) 5

Q6. Roots of the equation $x^2 – 0.04$ are

- (a) 0.4
- (b) 0.04
- (c) no root
- (d) 4

- Q7. For what value(s) of k does the quadratic equation $x^2 + (k-3)x + k = 0$ have one positive and one negative root?
- (a) 1
 - (b) 2
 - (c) 5
 - (d) -1
- Q8. Find the value of the expression $1 - 6 + 2 - 7 + 3 - 8 + \dots$ 50 terms (A.P.)
- (a) 125
 - (b) -125
 - (c) 250
 - (d) -250
- Q9. Which of the following is correct with respect to Similarity of Triangles
- (a) All congruent triangles are similar
 - (b) All similar triangles are congruent
 - (c) Perimeter of similar triangles are equal
 - (d) Area of similar triangles are equal
- Q10. Two triangles $\triangle ABC$ and $\triangle DEF$ are similar. Which of the following statements is always true?
- (a) The corresponding angles are equal
 - (b) The corresponding sides are proportional
 - (c) both a & b
 - (d) none of the above
- Q11. Two triangles are similar, then the trigonometric ratios of the corresponding angles will be
- (a) Always equal
 - (b) Never equal
 - (c) Depends upon the corresponding sides
 - (d) Data insufficient
- Q12. Which of the following is true with respect to trigonometric ratios?
- (a) $\sin 82^\circ > \sin 42^\circ$
 - (b) $\cos 47^\circ > \cos 16^\circ$
 - (c) $\tan 45^\circ = \cot 90^\circ$
 - (d) none of the above
- Q13. If the distance between the points $(4, p)$ and $(1, 0)$ is 5, then the value of p is
- (a) 4
 - (b) -4
 - (c) ± 4
 - (d) 0.4
- Q14. If the area of a sector of a circle is $7/20$ of the area of circle, then angle at the centre is equal to
- (a) 110°
 - (b) 130°
 - (c) 100°
 - (d) 126°

- Q15. Two solid right circular cylinders A and B have the same radius and same height. In cylinder B, a small cylindrical portion is cut from the bottom and placed on the top of the same cylinder. No material is added or removed in the process. With respect to cylinders A and B, which of the following is correct?
- (a) Both the volume and total surface area are different
 - (b) Both the volume and total surface area are the same
 - (c) Volume is the same but total surface area is different
 - (d) Volume is different but total surface area is the same
- Q16. If the length of the shadow of a tower is decreasing, then the angle of elevation of the sun is
- (a) decreasing
 - (b) increasing
 - (c) same
 - (d) can't say
- Q17. What is the maximum and minimum value of probability of an event?
- (a) 1,0
 - (b) 1,-1
 - (c) 0.5, 0
 - (d) 0,-1
- Q18. The mean of 10 numbers is 12.5. The mean of first six is 15 and last five is 10. Then the sixth number is:
- (a) 10
 - (b) 20
 - (c) 15
 - (d) 25
- Q19. If all sides of parallelogram touch a circle, then it is a
- (a) Square
 - (b) Rhombus
 - (c) Rectangle
 - (d) Trapezium
- Q20. The median of a given data set is y . Each data value is multiplied by 100, then the new median is:
- (a) y
 - (b) $100y$
 - (c) $50y$
 - (d) 0

Section B (5x2 = 10)

Q21. Find the values of x and y : $\frac{2}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 2$ & $\frac{4}{\sqrt{x}} - \frac{9}{\sqrt{y}} = -1$

OR

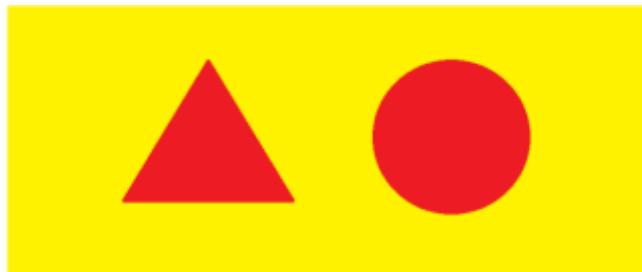
Solve for x and y : $3(2x + y) = 7xy$ & $3(x + 3y) = 11xy$

- Q22. A boy of height 90cm is walking away from the base of a lamp post at a speed of 1.2m/sec. If the lamp is 3.6m above the ground, find the length of his shadow after 4 seconds.

OR

Prove that the perimeters of two similar triangles are in the same ratio as their corresponding sides.

- Q23. A boy organizes a game in which a player throws a ball at random onto a rectangular chart paper of dimensions $10 \text{ cm} \times 20 \text{ cm}$ with his eyes closed. On the chart paper, an equilateral triangular region of side 2 cm and a circular region of radius 7 cm are marked, as shown in the figure. The player wins the game if the ball lands inside either the triangular region or the circular region. Find the probability that the player wins the game.



- Q24. The HCF and LCM of two numbers are 33 and 264 respectively. When the first number is divided by 2 exactly, the quotient obtained is 33. Find the numbers.
Q25. Derive the values of $\sin 30^\circ$ and $\sin 60^\circ$ geometrically.

OR

If $\sec \theta = x + 1/4x$, then prove that $\sec \theta + \tan \theta = 2x$ or $1/2x$

SECTION C (6x3 = 18)

- Q26. What will be the least possible number of planks, if there pieces of timber 42m, 49m and 69m long must be divided into planks of the same length.

OR

Floor of a room measures $12\text{m} \times 9\text{m}$. Find the minimum number of complete square marble slabs of equal size required to cover the entire floor.

- Q27. The ages of two friends A and P differ by 3 years. P's father Q is twice as old as P and A is twice as old as his/her sister K. The ages of K and Q differ by 30 years. Find the ages of A and A.

OR

A train covered a certain distance at a uniform speed. If the train would have been 6km/h faster, it would have taken 4 hours less than the scheduled time. And, if the train were slower by 6km/h , it would have taken 6 hours more than the scheduled time. Find the length of journey.

- Q28. If $(\sec A + \tan A)(\sec B + \tan B)(\sec C + \tan C) = (\sec A - \tan A)(\sec B - \tan B)(\sec C - \tan C)$, prove that each of the sides is equal to ± 1 .

OR

Prove:

$$\left(\frac{1 + \sin \theta - \cos \theta}{1 + \sin \theta + \cos \theta} \right)^2 = \frac{1 - \cos \theta}{1 + \cos \theta}$$

- Q29. A cone made up of paper has height $3h$ and vertical angle 2α . It contains two other cones of height $2h$ and h and vertical angles 4α and 6α respectively. Find the ratio of the two volumes in between the cones.

OR

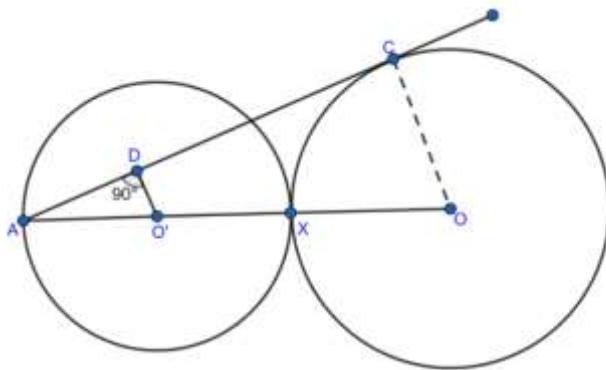
Water flows through a cylindrical pipe, whose inner radius is 1cm, at the rate of 80cm/s in an empty cylindrical tank, the radius of whose base is 40cm. What is the rise of water level in tank in half an hour?

- Q30. If $(-2, 3)$, $(4, -3)$ and $(4, 5)$ are the mid-points of the sides of a triangle, find the coordinates of its centroid.

OR

Give the equation of the line passing through the mid-point of the line segment joining the points A $(-5, 4)$ and B $(-1, 6)$.

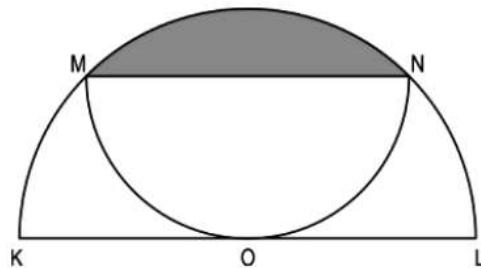
- Q31. In the figure given below, equal circles with centres O and O' touch each other at X. OO' is produced to meet a circle O' at A. AC is tangent to the circle whose centre is O. O'D is perpendicular to AC. Find the value of $\frac{AO'}{AO}$



From a point P, two tangents PA and PB are drawn to a circle with centre O. If OP=diameter of the circle, show that $\triangle APB$ is equilateral.

SECTION D (4x5 = 20)

- Q32. A semi-circle MON is inscribed in another semi-circle. Radius OL of the larger semi-circle is 6cm. Find the area of the shaded segment in terms of π .



OR

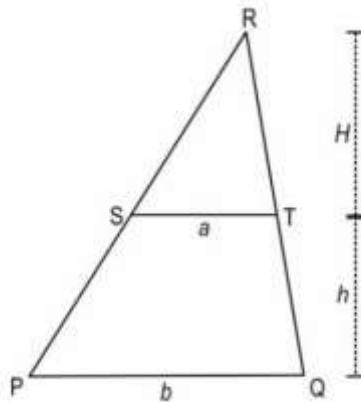
In an equilateral triangle of side 24 cm, a circle is inscribed touching its sides. Find the area of the remaining portion of the triangle. (Take $\sqrt{3} = 1.732$)

- Q33. The ratio of the sum of n terms of two AP's is $(7n + 1):(4n + 27)$. Find the ratio of their m^{th} terms.

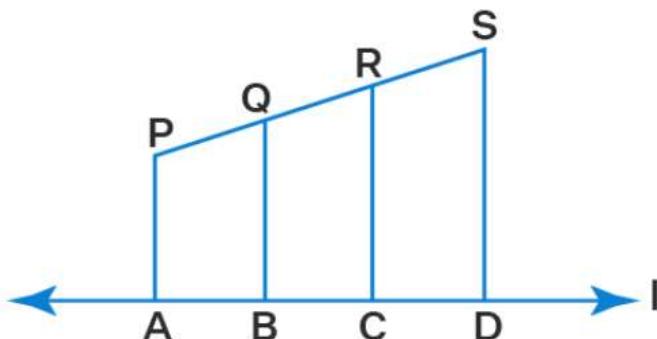
OR

If there are $(2n + 1)$ terms in an AP, then prove that the ratio of the sum of odd terms and the sum of even terms is $(n + 1):n$.

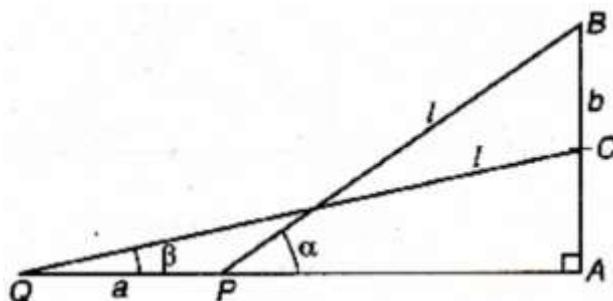
- Q34. In the figure below, $ST \parallel PQ$. All measurements are in units. Prove that the area of the trapezium $PQTS$ is $[0.5(a+b)h]$.



In the figure shown below PA, QB, RC and SD are all perpendiculars to a line l . $AB = 6 \text{ cm}$, $BC = 9 \text{ cm}$, $CD = 12 \text{ cm}$ and $SP = 36 \text{ cm}$. Find PQ , QR and RS .



- Q35. A ladder rests against a wall at an angle α to the horizontal. Its foot is pulled away from the wall through a distance a , so that slides a distance b down the wall making an angle β with the horizontal. Prove:



OR

From an aeroplane vertically above a straight horizontal road, the angles of depression of two consecutive mile stones on opposite sides of the aeroplane are observed to be α and β . Show that the height in miles of aeroplane above the road is given by:

$$\frac{\tan \alpha \tan \beta}{\tan \alpha + \tan \beta}$$