

COMMON SECOND REVISION TEST - 2020

STANDARD - X

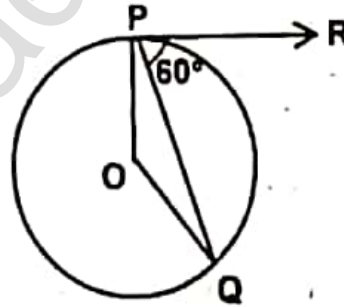
Time : 3.00 hrs

Mathematics
 Part - I

Marks: 100
 14 x 1 = 14

Choose the correct answer:

- If $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup B) \times B]$ is
 a) 20 b) 8 c) 12 d) 16
- The relation $R : A \rightarrow B$ by $R = \{(3, 7), (4, 9), (5, 11), (3, 15)\}$ where $A = \{3, 4, 5, 6\}$, $B = \{7, 9, 11, 13, 15\}$ is
 a) one-one function b) onto function c) bijective function d) not a function
- 3, 15, 27, 39, ... 171. In the A.P. what is the 6th term from the last term?
 a) 99 b) 111 c) 100 d) cannot find
- The solution of the equation $(2x - 1)^2 = 9$ is/are
 a) -1, 2 b) -1 c) 3, 1 d) 2, 3
- $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$. In the matrix equation, the matrix X is
 a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$
- In $\triangle ABC$, $BC \parallel DE$, $AB = 3.6$ cm, $AC = 2.4$ cm, $AD = 2.1$ cm then what is AE ?
 a) 1.4cm b) 1.8cm c) 1.2cm d) 1.05cm
- PR is a tangent. Then $\angle POQ$ is
 a) 120° b) 100°
 c) 110° d) 90°



- In rectangle ABCD, the side BC is parallel to x-axis. Then the slope of the side AB is
 a) 0 b) 1 c) $\sqrt{3}$ d) not defined

- If $5x = \sec\theta$, $\frac{5}{2} = \tan\theta$, then value of $x^2 - \frac{1}{x^2}$ is

- a) 25 b) 5 c) $\frac{1}{25}$ d) 1

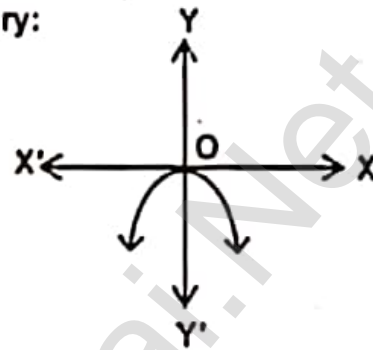
- The ratio of the height of a tree and its length of its shadow is $\sqrt{3} : 1$. Then the angle of elevation of the sun is
 a) 45° b) 30° c) 90° d) 60°

11. The ratio of volumes of a cylinder a cone and a sphere having same diameter and height is
 a) 1 2 3 b) 2 1 3 c) 1 3 2 d) 3:1 2
12. The range of the first 10 prime numbers is
 a) 20 b) 27 c) 21 d) 29
13. A card is drawn random from a pack of 52 cards. What is the probability of getting a face card or a spade card?
 a) 15/52 b) 25/52 c) 22/52 d) 30/52
14. The point of intersection of the lines $3x - y = 4$ and $x + y = 8$ is
 a) (5, 3) b) (2, 4) c) (3, 5) d) (4, 4)

Part - II

II. Answer any 10 question. Qn.No. 28 is compulsory:

10 x 2 = 20



15. Check whether the given represents a function
 Justify your answer
16. $f(x) = 3x - 2$, $g(x) = 2x + k$ and $f \circ g = g \circ f$
 Then find the value of k .
17. Solve $10^4 \equiv x \pmod{19}$
18. Simplify $\frac{4x}{x^2 - 1} - \frac{x - 1}{x - 1}$
19. If α and β are the roots of $3x^2 + 7x - 2 = 0$, find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$
20. Construct a 3×3 matrix such that $a_{ij} = |i - 2j|$
21. Prove that $\sec\theta - \cos\theta = \tan\theta \cdot \sin\theta$
22. If the lines $12y = -(p+3)x + 12$ and $12x - 7y = 16$ are perpendicular, find the value of p .
23. The standard deviation and the mean of a data are 6.5 and 12.5. Find its coefficient of variation
24. Two tangents are drawn from a point P to a circle of radius $\sqrt{3}$. The angle between the tangents is 60° . Find the lengths of a 2 tangents.
25. A garden is levelled by a cylinder of length 3m and diameter 2.8 m. Find the area of the ground for 8 revolutions.
26. Three coins are tossed simultaneously. Find the probability of getting (i) atleast one head
 ii) three tails.
27. Show that the points (7, 10), (-2, 5) and (3, 4) form a right triangle by using slope.
28. How many terms should be added in the series $1+5+9+13+\dots$ to get 190)

Part - III

III. Answer any 10 questions. Qn.No.42 is compulsory:

10 x 5 = 50

29. $A = \{x \in N/1 < x < 4\}$, $B = \{x \in W/0 \leq x < 2\}$ $C = \{x \in N/x < 3\}$ Verify the following
 i) $A \times (B \cup C) = (A \times B) \cup (A \times C)$ ii) $A \times (B \cap C) = (A \times B) \cap (A \times C)$
30. A function 't' is defined in temperature from Celsius (C) to Fahrenheit (F) such that $t(C) = F$ where
 $F = \frac{9}{5} C + 32$. Find the following (i) $t(0^\circ)$ ii) $t(28^\circ)$ iii) $t(-10^\circ)$ iv) the value of C such that
 $t(C) = 212^\circ$ (v) the temperature at which C and F are equal.

31 If $S_n (x + y) + (x^2 + xy + y^2) + (x^3 + x^2y + xy^2 + y^3) + \dots$ n terms then prove

$$(x + y) S_n = \left[\frac{x^2(x^n - 1)}{x - 1} - \frac{y^2(y^n - 1)}{y - 1} \right]$$

32 Rekha has square colour papers of sides 10cm, 11cm, 12cm, 24 cm. How much area can be decorated by using these papers?

33 Find the square root of $\frac{4x^2}{y^2} + \frac{20x}{y} + 13 - \frac{30y}{x} + \frac{9y^2}{x^2}$

34 If $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ Prove that $(AB)^T = B^T A^T$

35 A train covers a distance of 360 km at a uniform speed. Had its speed increased by 5km/hr, the time taken would have been decreased by 48min. Find the uniform speed of the train.

36 In a right $\triangle ABC$, $\angle C = 90^\circ$ and P and Q are the mid points of the sides CA and CB. Then prove that $4(AQ^2 + BP^2) = 5AB^2$

37 If the points A (-3, 9), B (a, b) and C (4, -5) are collinear and $a + b = 1$, find the values of a and b.

38 From the top of a tree of height 13m, the angles of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree.

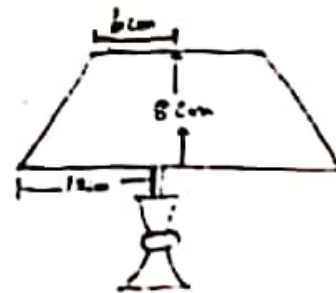
39 Water is flowing through a pipe of diameter 14cm, at a rate of 15km/hr into a tank of dimensions 50cm by 44cm. Calculate the time to rise the water level in the tank by 21cm.

40 a) Calculate the range and coefficient of range 63, 89, 98, 125, 79, 108, 117, 68.

b) Calculate the standard deviation of the first 21 natural numbers.

41 Two dice are rolled together. Find the probability of getting an even number on the first die or a sum 6.

42 A frustum shaped outer portion of a table lamp has to be painted including the top portion. Find the cost of painting the lamp at the rate of Rs. 2 per cm^2 .



Part - IV

IV. Answer both the questions:

2 x 8 = 16

43 a) Construct a triangle PQR in which $PQ = 6.8\text{cm}$, the vertical angle is 50° and the bisector of the vertical angle intersects the base at D such that $PD = 5.2\text{cm}$ (OR)

b) Construct two tangents from a point P at a distance of 8 cm from a circle of diameter 6cm. Measure the lengths of tangents and verify by calculation.

44 a) Solve the quadratic equation $x^2 - 5x - 14 = 0$ by drawing the graph $y = x^2 - 5x - 6$ (OR)

b) Solve $\frac{1}{2x} + \frac{1}{4y} - \frac{1}{3z} = \frac{1}{4} \cdot \frac{1}{x} = \frac{1}{3y} \cdot \frac{1}{x} - \frac{1}{5y} + \frac{4}{z} = 2 \frac{2}{15}$