

RAVI MATHS TUITION CENTER, PH- 8056206308

10th MATHS MODEL PAPER 10

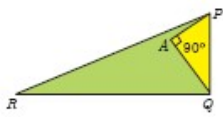
10th Standard

Maths

Exam Time : 03:00:00 Hrs

Total Marks : 100

14 x 1 = 14

- 1) If $f: A \rightarrow B$ is a bijective function and if $n(B) = 8$, then $n(A)$ is equal to
 (a) 7 (b) 49 (c) 1 (d) 14
- 2) Let $f(x) = \sqrt{1+x^2}$ then
 (a) $f(xy) = f(x).f(y)$ (b) $f(xy) \geq f(x).f(y)$ (c) $f(xy) \leq f(x).f(y)$ (d) None of these
- 3) $7^{4k} \equiv \underline{\hspace{2cm}} \pmod{100}$
 (a) 1 (b) 2 (c) 3 (d) 4
- 4) Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
 (a) 3 (b) 5 (c) 8 (d) 11
- 5) The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to
 (a) $\frac{16}{5} \left| \frac{x^2z^4}{y^2} \right|$ (b) $16 \left| \frac{y^2}{x^2z^2} \right|$ (c) $\frac{16}{5} \left| \frac{y}{xz^2} \right|$ (d) $\frac{16}{5} \left| \frac{xz^2}{y} \right|$
- 6) Which of the following should be added to make $x^4 + 64$ a perfect square
 (a) $4x^2$ (b) $16x^2$ (c) $8x^2$ (d) $-8x^2$
- 7) If $A = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 0 \\ 2 & -1 \\ 0 & 2 \end{pmatrix}$ and $C = \begin{pmatrix} 0 & 1 \\ -2 & 5 \end{pmatrix}$, Which of the following statements are correct?
 (i) $AB + C = \begin{pmatrix} 5 & 5 \\ 5 & 5 \end{pmatrix}$
 (ii) $BC = \begin{pmatrix} 0 & 1 \\ 2 & -3 \\ -4 & 10 \end{pmatrix}$
 (iii) $BA + C = \begin{pmatrix} 2 & 5 \\ 3 & 0 \end{pmatrix}$
 (iv) $(AB)C = \begin{pmatrix} -8 & 20 \\ -8 & 13 \end{pmatrix}$
 (a) (i) and (ii) only (b) (ii) and (iii) only (c) (iii) and (iv) only (d) all of these
- 8) The perimeters of two similar triangles $\triangle ABC$ and $\triangle PQR$ are 36 cm and 24 cm respectively. If $PQ = 10$ cm, then the length of AB is
 (a) $6\frac{2}{3}$ (b) $\frac{10\sqrt{6}}{3} \text{ cm}$ (c) $60\frac{2}{3} \text{ cm}$ (d) 15cm
- 9) In the given figure $PR = 26$ cm, $QR = 24$ cm, $\angle PAQ = 90^\circ$, $PA = 6$ cm and $QA = 8$ cm Find $\angle PQR$

 (a) 80° (b) 85° (c) 75° (d) 90°
- 10) The straight line given by the equation $x = 11$ is

- (a) parallel to X axis (b) parallel to Y axis (c) passing through the origin (d) passing through the point (0,11)

11) If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then the slope of the perpendicular bisector of PQ is

- (a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $\frac{1}{\sqrt{3}}$ (d) 0

12) if $\sin\theta = \cos\theta$, then $2\tan^2\theta + \sin^2\theta - 1$ is equal to

- (a) $\frac{-3}{2}$ (b) $\frac{3}{2}$ (c) $\frac{2}{3}$ (d) $\frac{-2}{3}$

13) A solid sphere of radius x cm is melted and cast into a shape of a solid cone of same radius. The height of the cone is

- (a) 3 x cm (b) x cm (c) 4 x cm (d) 2x cm

14) The probability a red marble selected at random from a jar containing p red, q blue and r green marbles is

- (a) $\frac{q}{p+q+r}$ (b) $\frac{p}{p+q+r}$ (c) $\frac{p+q}{p+q+r}$ (d) $\frac{p+r}{p+q+r}$

$$10 \times 2 = 20$$

15) If α and β are the roots of $x^2 + 7x + 10 = 0$ find the values of

$$\alpha^4 + \beta^4$$

16) An insect 8 m away initially from the foot of a lamp post which is 6 m tall, crawls towards it moving through a distance. If its distance from the top of the lamp post is equal to the distance it has moved, how far is the insect away from the foot of the lamp post?

17) Find the equation of a straight line whose

Slope is 5 and y intercept is -8

18) Show that $\tan^4\theta + \tan^2\theta = \sec^4\theta - \sec^2\theta$.

19) Find the depth of a cylindrical tank of radius 28 m, if its capacity is equal to that of a rectangular tank of size 28 m x 16 m x 11 m.

20) A bag contains 5 blue balls and 4 green balls. A ball is drawn at random from the bag. Find the probability that the ball drawn is (i) blue (ii) not blue.

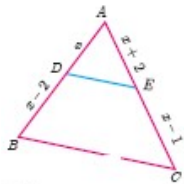
21) Is $7 \times 5 \times 3 \times 2 + 3$ a composite number? Justify your answer

22) Find the rational form of the number 0.6666....

23) Find the sum and product of the roots for each of the following quadratic equations:

$$kx^2 - k^2x - 2k^3 = 0$$

24) In $\triangle ADC$, if $DE \parallel BC$, $AD=x$, $DB=x-2$, and $EC=x-1$ then find the lengths of the sides AB and AC.

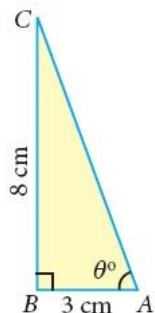


25) A(1, -2), B(6, -2), C(5, 1) and D(2, 1) be four points

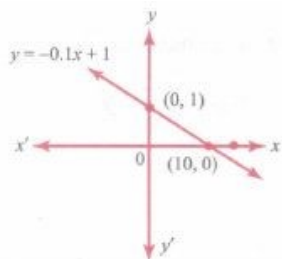
Find the slope of the line segment (a) AB (b) CD

26)

calculate the size of $\angle BAC$ in the given triangles



- 27) The volume of a cylindrical water tank is 1.078×10^6 litres. If the diameter of the tank is 7m, find its height.
- 28) The mean of a data is 25.6 and its coefficient of variation is 18.75. Find the standard deviation. $10 \times 5 = 50$
- 29) Let $A = \{1, 2, 3\}$ and $B = \{x \mid x \text{ is a prime number less than } 10\}$. Find $A \times B$ and $B \times A$.
- 30) Let $A = \{1, 2, 3, 4, \dots, 45\}$ and R be the relation defined as “is square of” on A . Write R as a subset of $A \times A$. Also, find the domain and range of R .
- 31) When the positive integers a , b and c are divided by 13, the respective remainders are 9, 7 and 10. Show that $a+b+c$ is divisible by 13.
- 32) Find the sum of all natural numbers between 602 and 902 which are not divisible by 4.
- 33) If $S_n = (x + y) + (x^2 + xy + y^2) + (x^3 + x^2y + xy^2 + y^3) + \dots$ n terms then prove that $(x - y)S_n = \left[\frac{x^2(x^n - 1)}{x - 1} - \frac{y^2(y^n - 1)}{y - 1} \right]$
- 34) A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.
- 35) Music is been played in two opposite galleries with certain group of people. In the first gallery a group of 4 singers were singing and in the second gallery 9 singers were singing. The two galleries are separated by the distance of 70 m. Where should a person stand for hearing the same intensity of the singers voice? (Hint: The ratio of the sound intensity is equal to the square of the ratio of their corresponding distances).
- 36) If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that $A^2 - (a + d)A = (bc - ad)I_2$
- 37) Find the equation of the perpendicular bisector of the line joining the points $A(-4, 2)$ and $B(6, -4)$.
- 38) You are downloading a song. The percent y (in decimal form) of mega bytes remaining to get downloaded in x seconds is given by $y = -0.1x + 1$.



Find the total MB of the song.

- 39) An aeroplane is flying parallel to the Earth's surface at a speed of 175 m/sec and at a height of 600 m. The angle of elevation of the aeroplane from a point on the Earth's surface is 37° at a given point. After what period of time does the angle of elevation increase to 53° ? ($\tan 53^\circ = 1.3270$, $\tan 37^\circ = 0.7536$)

40) if $\sin\theta (1+\sin^2\theta)=\cos^2\theta$, then prove that $\cos^6\theta -4\cos^4\theta +8\cos^2\theta =4$

41) If the mean and coefficient of variation of a data are 15 and 48 respectively, then find the value of standard deviation.

42) a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3}$)

(OR)

b) Construct a $\triangle PQR$ in which $QR= 5$ cm, $\angle P=40^\circ$ and the median PG from P to QR is 4.4 cm. Find the length of the altitude from P to QR .

43) a) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$
