

Mathematics

(a) 20 years (b) 30 years (c) 40 years (d) 50 years

Q24. Three numbers are in the ratio 3: 2: 5 and the sum of their squares is 1862. What are the three numbers?

(a) 18, 12, 30 (b) 24, 16, 40
(c) 15, 10, 25 (d) 21, 14, 35

Q25. If $x: y = 7: 5$, then what is the value of $(5x - 2y): (3x + 2y)$?

(a) $5/4$ (b) $6/5$ (c) $25/31$ (d) $31/42$

Q26. A milkman claims to sell milk at its cost price only, but he is making a profit of 20% since he has mixed some amount of water in the milk. What is the percentage of milk in the mixture?

(a) 80% (b) $250/3\%$ (c) 75% (d) $200/3\%$

Q27. Out of 250 observations, the first 100 observations have mean 5 and the average of the remaining 150 observations is 253. What is the average of the whole group of observations?

(a) 6 (b) 7 (c) 8 (d) 9

Q28. The compound interest on a sum for 2 years is Rs 832 and the simple interest on the same sum at the same rate for the same period is Rs 800. What is the rate of interest?

(a) 6% (b) 8% (c) 10% (d) 12%

Q29. What is the compound interest on Rs 1600 at 25% per annum of 2 years compounded annually?

(a) Rs 700 (b) Rs 750 (c) Rs 800 (d) Rs 900

Q30. A man buys 4 tables and 5 chairs for Rs 1000. If he sells the tables at 10% profit and chairs 20% profit, he earns a profit of Rs 120. What is the cost of one table?

(a) Rs 200 (b) Rs 220 (c) Rs 240 (d) Rs 260

Q31. One saree was purchased for Rs 564 after getting a discount of 6% and another saree was purchased for Rs 396 after getting a discount of 1%. Taking both the items as a single transaction, what is the percentage of discount?

(a) 3.5 (b) 4 (c) 7 (d) 7.5

Q32. A cloth store is offering buy 3, get 1 free. What is the net percentage discount being offered by the store?

(a) 20% (b) 25% (c) 30% (d) $100/3\%$

Q33. A train crosses a telegraph post in 8s and a bridge 200 m long in 24 s. What is the length of the train?

(a) 100 m (b) 120 m (c) 140 m (d) 160 m

Q34. Two trains of lengths 100 m and 150 m are travelling in opposite directions at speeds of 75 km/h and 50 km/h, respectively. What is the time taken by them to cross each other?

(a) 7.4 s (b) 7.2 s (c) 7 s (d) 6.8 s

Q35. A person travels a certain distance at 3 km/h and reaches 15 min late. If he travels at 4 km/h, he reaches 15 min earlier. The distance he has to travel is

(a) 4.5 km (b) 6 km (c) 7.2 km (d) 12 km

Q36. A car travels the first one-third of a certain distance with a speed of 10 km/hr, the next one-third distance with a speed of 20 km/hr and the last one-third distance with a speed of 60 km/hr. The average speed of the car for the whole journey is

(a) 18 km/hr (b) 24 km/hr
(c) 30 km/hr (d) 36 km/hr

Q37. Ram can do a piece of work in 6 days and Shyam can finish the same work in 12 days. How much work will be finished, if both work together for 2 days?

(a) One-fourth of the work
(b) One-third of the work
(c) Half of the work
(d) Whole of the work

Q38. Four taps can individually fill a cistern of water in 1h, 2h, 3h and 6h, respectively. If all the four taps are opened simultaneously, the cistern can be filled in how many minutes?

(a) 20 (b) 30 (c) 35 (d) 40

Q39. 18 men can earn Rs 360 in 5 days. How much money will 15 men earn in 9 days?

(a) Rs 600 (b) Rs 540 (c) Rs 480 (d) Rs 360

Q40. A and B can do a piece of work in 10 h. B and C can do it in 15 h, while A and C take 12 h to complete the work. B independently can complete the work in

(a) 12h (b) 16h (c) 20h (d) 24h

Q41. If $(x + y + z = 0)$, then what is $(x + y)(y + z)(z + x)$ equal to?

(a) $-xyz$ (b) $x^2 + y^2 + z^3$
(c) $x^3 + y^3 + z^3 + 3xyz$ (d) xyz

Q42. If $x^2 - 11x + a$ and $x^2 - 14x + 2a$ have a common factor, then what are the values of a ?

(a) 0, 7 (b) 5, 20 (c) 0, 24 (d) 1, 3

Q43. Which one of the following statements is correct?

(a) Remainder theorem is a special case of factor theorem
(b) Factor theorem is a special case of remainder theorem
(c) Factor theorem and remainder theorem are two independent results
(d) None of the above

Q44. What is the remainder when $(x^{11} + 1)$ is divided by $(x + 1)$?

(a) 0 (b) 2 (c) 11 (d) 12

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Q45. If the expression $x^3 + 3x^2 + 4x + k$ has a factor

$x + 5$, then what is the value of k ?

- (a) -70 (b) 70 (c) 48 (d) -48

Q46. If $(49)^2 - (25)^2 = 37x$, then what is x equal to?

- (a) 64 (b) 74 (c) 48 (d) 42

Q47. If a set A contains 60 elements and another set B contains 70 elements and there are 50 elements in common, then how many elements does $A \cup B$ contain?

- (a) 130 (b) 100 (c) 80 (d) 70

Q48.

If $\theta \in \mathbb{R}$ be such that $\sec \theta > 0$ and $2 \sec^2 \theta + \sec \theta - 6 = 0$. Then, what is the value of $\operatorname{cosec} \theta$?

(a)

$\sqrt{5}$

(b)

$\frac{\sqrt{3}}{2}$

(c)

$\frac{3}{\sqrt{5}}$

(d)

$\frac{2}{\sqrt{3}}$

Q49.

If $2x^2 \cos 60^\circ - 4 \cot^2 45^\circ - 2 \tan 60^\circ = 0$, then what is the value of x ?

(a) 2

(b) 3

(c)

$\sqrt{3} - 1$

(d)

$\sqrt{3} + 1$

Q50. Which one of the following is correct?

(a) $\tan x > 1, 45^\circ < x < 90^\circ$

(b)

$\sin x > \frac{1}{2}, 0^\circ < x < 30^\circ$

(c)

$\cos x > \frac{1}{2}, 60^\circ < x < 90^\circ$

(d) $\sin x = \cos x$ for some value of $x, 30^\circ < x < 45^\circ$

Q51.

If $\sin(x + 54^\circ) = \cos x$, where $0 < x, x + 54^\circ < 90^\circ$, then what is the value of x ?

- (a) 54° (b) 36° (c) 27° (d) 18°

Q52.

If $\tan^2 y \operatorname{cosec}^2 x - 1 = \tan^2 y$, then which one of the following is correct?

- (a) $x - y = 0$ (b) $x = 2y$ (c) $y = 2x$ (d) $x - y = 1^\circ$

Q53.

If $x + \left(\frac{1}{x}\right) = 2 \cos \alpha$, then what is the value of

$x^2 + \left(\frac{1}{x^2}\right)$?

- (a) $4 \cos^2 a$ (b) $4 \cos^2 a - 1$
(c) $2 \cos^2 a - 2 \sin^2 a$ (d) $\cos^2 a - \sin^2 a$

Q54.

If $\cot \theta = \frac{2xy}{x^2 - y^2}$, then what is $\cos \theta$ equal to?

(a)

$\frac{x^2 - y^2}{x^2 + y^2}$

(b)

$\frac{x^2 + y^2}{x^2 - y^2}$

(c)

$\frac{2xy}{x^2 + y^2}$

(d)

$\frac{2xy}{\sqrt{x^2 + y^2}}$

Q55.

In a $\triangle ABC$, $\angle ABC = 90^\circ$, $\angle ACB = 30^\circ$, $AB = 5$ cm. What is the length of AC ?

(a) 10 cm

(b) 5 cm

(c)

$5\sqrt{2}$ cm

(d)

$5\sqrt{3}$ cm

Q56. Two sides of an acute angle triangle are 6 cm and 2 cm, respectively. Which one of the following represents the correct range of the third side in cm?

- (a) $(4, 8)$

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(b)
 $(4, 2\sqrt{10})$

(c)
 $(4\sqrt{2}, 8)$

(d)
 $(4\sqrt{2}, 2\sqrt{10})$

Q57. A unit radian is approximately equal to

- (a) $57^\circ 17' 43''$ (b) $57^\circ 16' 22''$
(c) $57^\circ 17' 47''$ (d) $57^\circ 17' 49''$

Q58. Consider the following statements:

I. There is only one value of x in the first quadrant that satisfies $\sin x + \cos x = 2$.

II. There is only one value of x in the first quadrant that satisfies $\sin x - \cos x = 0$.

Which of the statements above is/are correct?

- (a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

Q59. A round balloon of unit radius subtends an angle of 90° at the eye of an observer standing at a point, say A.

What is the distance of the centre of the balloon from the point A?

- (a) $1/2$ (b) $\sqrt{2}$ (c) 2 (d) $1/2$

Q60. Two poles of heights 6 m and 11 m stand vertically upright on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?

- (a) 11 m (b) 12 m (c) 13 m (d) 14 m

Q61. From a rectangular sheet of cardboard of size 5 cm \times 2 cm, the greatest possible circle is cut-off. What is the area of the remaining part?

- (a) $(25 - p)$ cm² (b) $(10 - p)$ cm²
(c) $(4 - p)$ cm² (d) $(10 - 2p)$ cm²

Q62. What is the radius of the circle inscribed in a triangle having side lengths 35 cm, 44 cm and 75 cm?

- (a) 3 cm (b) 4 cm (c) 5 cm (d) 6 cm

Q63. If the area of a $\triangle ABC$ is equal to area of square of side length 6 cm, then what is the length of the altitude of AB, where AB = 9 cm?

- (a) 18 cm (b) 14 cm (c) 12 cm (d) 8 cm

Q64. Consider the following statements I. Area of a segment of a circle is less than area of its corresponding sector. II. Distance travelled by a circular wheel of diameter 2d cm in one revolution is greater than 6d cm.

Which of the above statements is/are correct?

- (a) Only I (b) Only II

- (c) Both I and II (d) Neither I nor II

Q65. The area of an isosceles triangle ABC with AB = AC and altitude AD = 3 cm is 12 sq cm. What is its perimeter?

- (a) 18 cm (b) 16 m (c) 14 cm (d) 12 cm

Q66. Consider an equilateral triangle of a side of unit length. A new equilateral triangle is formed by joining the mid-points of one, then a third equilateral triangle is formed by joining the mid-points of second. The process is continued. The perimeter of all triangles, thus formed is

- (a) 2 units (b) 3 units (c) 6 units (d) Infinity

Q67. The total surface area of a cone, whose generator is equal to the radius R of its base, is S. If A is the area of a circle of radius 2R, then which one of the following is correct?

- (a) $A = S$ (b) $A = 2S$ (c) $A = S/2$ (d) $A = 4S$

Q68. If the number of square centimetres on the surface area of a sphere is three times the number of cubic centimetres in its volume, then what is its diameter?

- (a) 1 cm (b) 2 cm (c) 3 cm (d) 6 cm

Q69. A solid metallic cube of edge 4 cm is melted and recast into solid cubes of edge 1 cm. If x is the surface area of the melted cube and y is the total surface area of all the cubes recast, then what is x: y?

- (a) 2: 1 (b) 1: 2 (c) 1: 4 (d) 4: 1

Q70. If a sphere of radius 10 cm is intersected by a plane at a distance 8 cm from its centre, what is the radius of the curve of intersection of the plane and the sphere?

- (a) 8 cm (b) 6 cm (c) 5 cm (d) 4 cm

Q71. A hemispherical bowl of internal radius 20 cm contains sauce. The sauce is to be filled in conical shaped bottles of radius 5 cm and height 8 cm. What is the number of bottles required?

- (a) 100 (b) 90 (c) 80 (d) 75

Q72. A figure is formed by revolving a rectangular sheet of dimensions 7 cm \times 4 cm about its length. What is the volume of the figure, thus formed?

- (a) 352 cu cm (b) 296 cu cm
(c) 176 cu cm (d) 616 cu cm

Q73. The material of a solid cone is converted into the shape of a solid cylinder of equal radius. If the height of the cylinder is 5 cm, what is the height of the cone?

- (a) 15 cm (b) 20 cm (c) 25 cm (d) 30 cm

Q74. What will be the cost to plaster the inner surface of a well 14 m deep and 4 m in diameter at the rate of Rs 25 per sq m?

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(a) Rs 4000 (b) Rs 4200 (c) Rs 4400 (d) Rs 5400

Q75. A right circular metal cone (solid) is 8 cm high and the radius is 2 cm. It is melted and recast into a sphere. What is the radius of the sphere?

(a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm

Q76. The height of a cylinder is 15 cm. The lateral surface area is 660 sq cm. Its volume is

(a) 1155 cu cm (b) 1215 cu cm
(c) 1230 cu cm (d) 2310 cu cm

Q77. What is the whole surface area of a cone of base radius 7 cm and height 24 cm?

(a) 654 sq cm (b) 704 sq cm
(c) 724 sq cm (d) 964 sq cm

Q78. What is the volume of the double cone so formed?

(a) 3124 cm³ (b) 3424 cm³
(c) 3768 cm³ (d) 3924 cm³

Q79. The radius of a sphere is equal to the radius of the base of a right circular cone, and the volume of the sphere is double the volume of the cone. The ratio of the height of the cone to the radius of its base is

(a) 2: 1 (b) 1: 2 (c) 2: 3 (d) 3: 2

Q80. Consider the following statements Two lines intersected by a transversal are parallel, if

I. the pairs of corresponding angles are equal.
II. the interior angles on the same side of the transversal are supplementary. Which of the statements given above is/are correct?

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

Q81. Consider the following statements

I. The locus of points which are equidistant from two parallel lines is a line parallel to both of them and drawn mid way between them

II. The perpendicular distances of any point on this locus line from two original parallel lines are equal. Further, no point outside this locus line has this property.

Which of the above statements is/are correct?

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

Q82. Consider the following statements A triangle can be constructed if its I. two sides and the included angles are given. II. three angles are given. III. two angles and the included side are given. Which of the statements given above are correct ?

(a) I and II (b) I and III
(c) II and III (d) All of these

Q83. Consider the following statements

I. Congruent triangles are similar.
II. Similar triangles are congruent.
III. If the hypotenuse and a side of one right

triangle are equal to the hypotenuse and a side of another right triangle respectively, then the two right triangles are congruent.

Which of the statement given above is/are correct?

(a) Only I (b) Only I
(c) Both II and III (d) Both I and III

Q84. Which one among the following is not correct?

(a) Two congruent triangles are necessarily similar
(b) All equiangular triangles are similar
(c) Two isosceles right triangles are similar
(d) All isosceles triangles are similar

Q85. Consider the following statements I. The perpendicular bisector of a chord of a circle does not pass through the centre of the circle. II. The angle in a semi-circle is a right angle. Which of the statements given above is/are correct?

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

Q86. In a cricket match, the first 5 batsmen of a team scored runs: 30, 40, 50, 30 and 40. If these data represent a four sided figure with 50 as its one of the diagonals, then what does second diagonal represent?

(a) 30 runs (b) 40 runs (c) 50 runs (d) 70 runs

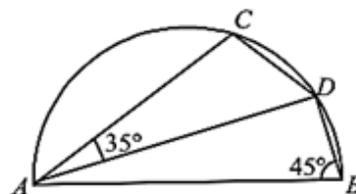
Q87. If two parallel lines are cut by two distinct transversals, then the quadrilateral formed by the four lines is always a

(a) square (b) parallelogram
(c) rhombus (d) trapezium

Q88. How many equilateral triangles can be formed by joining any three vertices of a cube?

(a) 0 (b) 4 (c) 8 (d) None of these

Q89



In the figure given above, C and D are points on the semi-circle described on AB as diameter. If $\angle ABD = 75^\circ$ and $\angle DAC = 35^\circ$, then what is the $\angle BDC$?

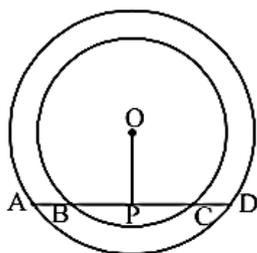
(a) 130° (b) 110° (c) 90° (d) 100°

Q90. What is the number of tangents that can be drawn to a circle from a point on the circle?

(a) 0 (b) 1 (c) 2 (d) 3

Q91.

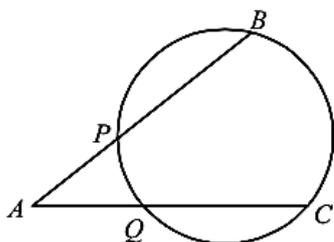
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In the figure given above, AD is a straight line, OP perpendicular to AD and O is the centre of both circles. If $OA = 20$ cm, $OB = 15$ cm and $OP = 12$ cm, then what is AB equal to ?

- (a) 7 cm (b) 8 cm (c) 10 cm (d) 12 cm

Q92.



In the figure given above, If $AP = 3$ cm, $PB = 5$ cm, $AQ = 2$ cm and $QC = x$, then what is the value of x ?

- (a) 6 cm
(b) 8 cm
(c) 10 cm
(d) 12 cm

Q93. ABCD is a quadrilateral, the sides of which touch a circle. Which one of the following is correct?

- (a) $AB + AD = CB + CD$
(b) $AB : CD = AD : BC$
(c) $AB + CD = AD + BC$
(d) $AB : AD = CB : CD$

Q94. ABC is an equilateral triangle inscribed in a circle with $AB = 5$ cm. Let the bisector of the angle A meet BC in X and the circle in Y. What is the value of AX. AY?

- (a) 16 cm^2
(b) 20 cm^2
(c) 25 cm^2
(d) 30 cm^2

Q95. The locus of the mid-points of all equal chords in a circle is

- (a) The circumference of the circle concentric with the given circle and having radius equal to the length of the chords.
(b) The circumference of the circle concentric with the given circle and having radius equal to the distance of the chords from the centre.
(c) The circumference of the circle concentric with the given circle and having radius equal to half of the radius of the given circle.
(d) The circumference of the circle concentric with the given circle and having radius equal to half of the distance of the chords from the centre.

Q96. If the angle between the radii of a circle is 130° , then the angle between the tangents at the ends of the radii is

- (a) 90°
(b) 70°
(c) 50°
(d) 40°

Q97. Which one of the following statements is not correct with reference to a histogram?

- (a) Frequency curve is obtained by joining the mid points of the top of the adjacent rectangles with smooth curves
(b) Histogram is drawn for continuous data
(c) The height of the bar is proportional to the frequency of that class
(d) Mode of the distribution can be obtained from the histogram

Q98. Consider the following pairs of numbers:

- I. (8, 12)
II. (9, 11)
III. (6, 24)

Which pairs of number have the same harmonic means?

- (a) I and II
(b) II and III
(c) I and III
(d) I, II and III

Q99. The arithmetic mean of 100 numbers was computed as 89.05. It was later found that two numbers 92 and 83 have been misread as 192 and 33, respectively. What is the correct arithmetic mean of the numbers?

- (a) 88.55
(b) 87.55
(c) 89.55
(d) Cannot be determined

Q100. Which one of the following relations for the numbers 10, 7, 8, 5, 6, 8, 5, 8 and 6 is correct?

- (a) Mean = Median
(b) Mean = Mode
(c) Mean > Median
(d) Mean > Mode