



**Q1. A solid metallic sphere of radius 21 cm is melted and recast into a cone with diameter of the base as 21 cm. What is the height (in cm) of the cone?**

- (a) 336
- (b) 112
- (c) 224
- (d) 66

**Q2. The radius of a wheel is 3.5 cm. What is the distance (in cm) travelled by the wheel in 20 revolutions?**

- (a) 220
- (b) 440
- (c) 880
- (d) 1320

**Q3. What is the value of**

$$\left[ \frac{1}{1-x^{(p-q)}} + \frac{1}{1-x^{(q-p)}} \right] ?$$

- (a) 0
- (b) 1
- (c)  $(xq - xp)/(xq + xp)$
- (d)  $(xq + xp)/(xq - xp)$

**Q4. If  $x^2 - 3x + 1 = 0$ , then what is the value of  $x + \frac{1}{x}$ ?**

- (a) 3
- (b) 7
- (c) 9
- (d) 11

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**Q5. If  $a + b + c = -11$ , then what is the value of  $(a + 4)^3 + (b + 5)^3 + (c + 2)^3 - 3(a + 4)(b + 5)(c + 2)$ ?**

- (a) -1331
- (b) -121
- (c) 0
- (d) 1331

**Q6. If  $\sqrt{7x + 12} + \sqrt{7x - 12} = 3 + \sqrt{33}$ , then what is the value of  $x$ ?**

- (a) 0
- (b) 1
- (c) 3
- (d) 9

**Q7. If the perimeter of a square is 44 cm, then what is the diagonal (in cm) of the square?**

- (a)  $11\sqrt{2}$
- (b)  $2\sqrt{11}$
- (c) 11
- (d)  $44\sqrt{2}$

**Q8. What is the curved surface area (in  $\text{cm}^2$ ) of a cylinder having radius of base as 14 cm and height as 10 cm?**

- (a) 440
- (b) 880
- (c) 220
- (d) 1320

**Q9. Three circles of radius 63 cm are placed in such a way that each circle touches the other two. What is the area of the portion enclosed by the three circles?**

- (a)  $7938\sqrt{3} - 4158$
- (b)  $3969\sqrt{3} - 4158$
- (c)  $7938\sqrt{3} - 6237$
- (d)  $3969\sqrt{3} - 6237$

**Q10. If  $(x/y)^{5a-3} = (y/x)^{17-3a}$ , then what is the value of  $a$ ?**

- (a) -7
- (b) -5
- (c) 0
- (d) 3

**Q11. What is the value of  $\left(\frac{x^2-x-6}{x^2+x-12}\right) \div \left(\frac{x^2+5x+6}{x^2+7x+12}\right)$ ?**

- (a) 1
- (b)  $(x - 3)/(x + 3)$
- (c)  $(x + 4)/(x - 3)$
- (d)  $(x - 3)/(x + 4)$

**Q12.** In  $\Delta PQR$ , a line parallel to side  $QR$  cuts the side  $PQ$  and  $PR$  at points  $M$  and  $N$  respectively and point  $M$  divide  $PQ$  in the ratio of  $1 : 2$ . If area of  $\Delta PQR$  is  $360 \text{ cm}^2$ , then what is the area (in  $\text{cm}^2$ ) of quadrilateral  $MNRQ$ ?

- (a) 160
- (b) 320
- (c) 120
- (d) 96

**Q13.**  $ABC$  is an isosceles triangle such that  $AB = AC = 30 \text{ cm}$  and  $BC = 48 \text{ cm}$ .  $AD$  is a median to base  $BC$ . What is the length (in  $\text{cm}$ ) of  $AD$ ?

- (a) 18
- (b) 20
- (c) 24
- (d) 32

**Q14.** In  $\Delta ABC$ ,  $\angle C = 54^\circ$ , the perpendicular bisector of  $AB$  at  $D$  meets  $BC$  at  $E$ . If  $\angle EAC = 42^\circ$ , then what is the value (in degrees) of  $\angle ABC$ ?

- (a) 25
- (b) 42
- (c) 50
- (d) 60

**Q15.** If  $\frac{1}{\cos\theta + \sec\theta} = \frac{1}{2}$ , then what is the value of  $\cos^{100}\theta + \sec^{100}\theta$ ?

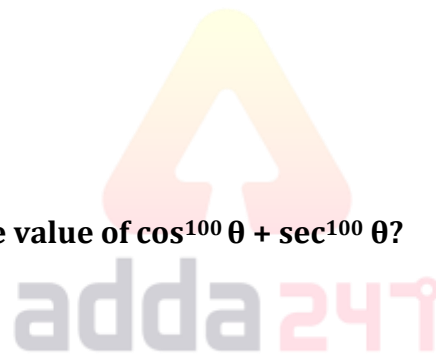
- (a) 0
- (b) 1
- (c) 2
- (d) 4

**Q16.** What is the simplified value of  $1 + \cot A \cot\left(\frac{A}{2}\right)$ ?

- (a)  $\cos\left(\frac{A}{2}\right)$
- (b)  $\sin^2\left(\frac{A}{2}\right)$
- (c)  $\frac{1}{2}\text{cosec}^2\left(\frac{A}{2}\right)$
- (d)  $\cos A$

**Q17.** If  $\tan\left(\frac{\theta}{2}\right) \tan\left(\frac{2\theta}{5}\right) = 1$ , then what is the value (in degrees) of  $\theta$ ?

- (a)  $45^\circ$
- (b)  $90^\circ$
- (c)  $100^\circ$
- (d)  $120^\circ$



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**Q18.** If  $(x - y) = 7$ , then what is the value of  $(x - 15)^3 - (y - 8)^3$ ?

- (a) 0
- (b) 343
- (c) 392
- (d) 2863

**Q19.** If  $x - y - \sqrt{18} = -1$  and  $x + y - 3\sqrt{2} = 1$ , then what is the value of  $12xy(x^2 - y^2)$ ?

- (a) 0
- (b) 1
- (c)  $512\sqrt{2}$
- (d)  $612\sqrt{2}$

**Q20.** If  $p/q = r/s = t/u = \sqrt{5}$ , then what is the value of  $[(3p^2 + 4r^2 + 5t^2)/(3q^2 + 4s^2 + 5u^2)]$ ?

- (a)  $1/5$
- (b) 5
- (c) 25
- (d) 60

**Q21.** In triangle ABC, a line is drawn from the vertex A to a point D on BC. If BC = 9 cm and DC = 3 cm, then what is the ratio of the areas of triangle ABD and triangle ADC respectively?

- (a) 1 : 1
- (b) 2 : 1
- (c) 3 : 1
- (d) 4 : 1

**Q22.** PQR is a right angled triangle in which  $\angle R = 90^\circ$ . If  $RS \perp PQ$ , PR = 3 cm and RQ = 4 cm, then what is the value of RS (in cm)?

- (a)  $12/5$
- (b)  $36/5$
- (c) 5
- (d) 2.5

**Q23.** In triangle PQR, A is the point of intersection of all the altitudes and B is the point of intersection of all the angle bisectors of the triangle. If  $\angle PBR = 105^\circ$ , then what is the value of  $\angle PAR$  (in degrees)?

- (a) 60
- (b) 100
- (c) 150
- (d) 115

**Q24.** If there are four lines in a plane, then what cannot be the number of points of intersection of these lines?

- (a) 0
- (b) 5
- (c) 4
- (d) 7

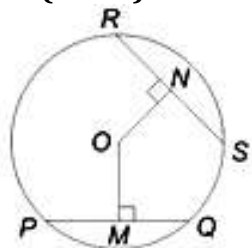
**Q25.** By what least number should 1200 be multiplied so that it becomes a perfect square?

- (a) 2
- (b) 3
- (c) 5
- (d) 13

**Q26.** PQRS is a square, M is the mid-point of PQ and N is a point on QR such that NR is two-third of QR. If the area of  $\Delta MQN$  is  $48 \text{ cm}^2$ , then what is the length(in cm) of PR ?

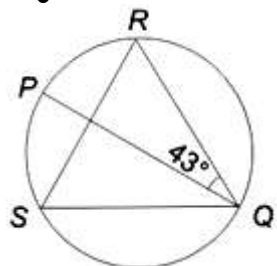
- (a)  $12\sqrt{2}$
- (b) 12
- (c) 24
- (d)  $24\sqrt{2}$

**Q27.** In the given figure,  $PQ = 30 \text{ cm}$ ,  $RS = 24 \text{ cm}$  and  $OM = 12 \text{ cm}$ , then what is the value of ON(in cm)?

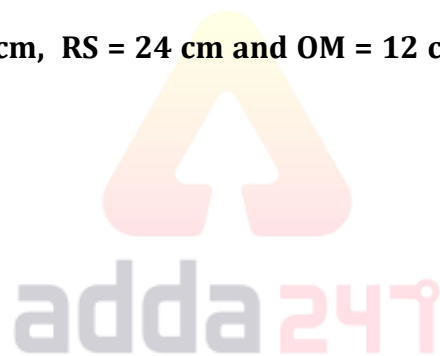


- (a) 9
- (b) 12
- (c) 15
- (b) 18

**Q28.** In the given figure, PQ is the diameter of the circle. What is the measure (in degrees) of  $\angle QSR$ ?



- (a) 23
- (b) 37
- (c) 47
- (d) 57



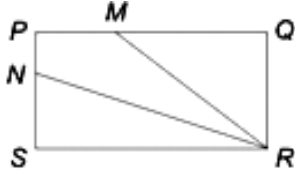
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**Q29.** In the given rectangle, PM is one-third of PQ and PN is one-third of PS. If the area of PMRN is  $17 \text{ cm}^2$ , then what is the area (in  $\text{cm}^2$ ) of PQRS?



- (a) 34
- (b) 51
- (c) 68
- (d) 85

**Q30.** What is the simplified value of  $(1 - \sin A \cos A)(\sin A + \cos A)$ ?

- (a)  $\sin^2 A - \cos^2 A$
- (b)  $\sin^3 A + \cos^3 A$
- (c) 0
- (d)  $\cos^2 A - \sin^2 A$

**Q31.** Sum of four times a fraction and 6 times its reciprocal is 11. What is the fraction?

- (a)  $3/4$
- (b)  $4/3$
- (c)  $4/7$
- (d)  $7/4$

**Q32.** What is the sum of the first 12 terms of an arithmetic progression if the 3<sup>rd</sup> term is -13 and the 6<sup>th</sup> term is -4?

- (a) 67
- (b) 45
- (c) -30
- (d) -48

**Q33.** What is the reflection of the point (5, 2) in the line  $x = -3$ ?

- (a) (-11, 2)
- (b) (-11, -2)
- (c) (11, -2)
- (d) (11, 2)

**Q34.** What are the co-ordinates of the centroid of a triangle, whose vertices are A (1, -5), B (4, 0) and C (-2, 2)?

- (a) (1, -1)
- (b) (-1, 1)
- (c) (2, -2)
- (d) (-2, 2)

**Q35. Slope of the line AB is  $-\frac{4}{3}$ . Co-ordinates of points A and B are  $(x, -5)$  and  $(-5, 3)$  respectively. What is the value of  $x$ ?**

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

**Q36. D and E are points on side AB and AC of  $\Delta ABC$ . DE is parallel to BC. If  $AD:DB = 2:5$  and area of  $\Delta ADE$  is 8 sq cm, what is the ratio of area of  $\Delta ADE$ : area of quadrilateral BDEC?**

- (a) (4:45)
- (b) (45:4)
- (c) (8:45)
- (d) (45:8)

**Q37. If  $x = 7 + 2\sqrt{10}$ , then what is the value of  $\sqrt{x} - \frac{1}{\sqrt{x}}$ ?**

- (a)  $2\sqrt{2}$
- (b)  $\frac{2}{3}(2\sqrt{5} + \sqrt{2})$
- (c)  $-2\sqrt{2}$
- (d)  $\frac{2}{3}(2\sqrt{2} + \sqrt{5})$

**Q38. Which of the following relation(s) is/are true?**

- I.  $\sqrt{7} + \sqrt{3} > \sqrt{5} + \sqrt{5}$
- II.  $\sqrt{5} + \sqrt{5} > \sqrt{2} + \sqrt{8}$
- III.  $\sqrt{5} + \sqrt{5} > \sqrt{7} + \sqrt{3}$

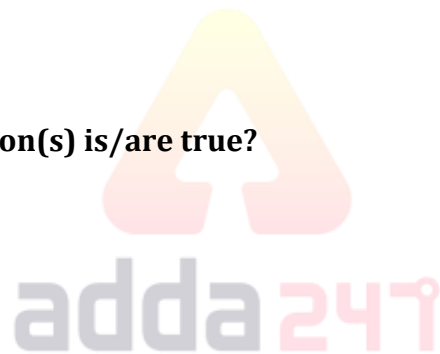
- (a) Only I
- (b) Only II and III
- (c) Only I and III
- (d) All I, II and III

**Q39. The perimeter of a rhombus is 20 cm and one of the diagonal is 8 cm. what is the area (in  $\text{cm}^2$ ) of the rhombus?**

- (a) 12
- (b) 24
- (c) 48
- (d) 96

**Q40. Three circles of radius 9 cm are kept touching each other. The string is tightly tied around the three circles. What is the length (in cm) of the string?**

- (a)  $48 + 18\pi$
- (b)  $48 + 24\pi$
- (c)  $54 + 18\pi$
- (d)  $54 + 24\pi$



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**VALIDITY - 1 MONTHS**

**Q41. The difference between circumference and the radius of a circle is 111 cm. What is the area (in  $\text{cm}^2$ ) of the circle?**

- (a) 469
- (b) 1386
- (c) 912
- (d) 1086

**Q42. If the diameter of a sphere is 14 cm, then what is the curved surface area (in  $\text{cm}^2$ ) of the sphere?**

- (a) 616
- (b) 1232
- (c) 2464
- (d) 576

**Q43. If the ratio of volume of two cubes is 11: 13, then what is the ratio of the sides of the two cubes?**

- (a) 11 : 13
- (b) 121 : 169
- (c)  $(11)^{1/2} : (13)^{1/2}$
- (d)  $(11)^{1/3} : (13)^{1/3}$

**Q44. If PA is the median of the triangle PQR and G be the centroid, then what is the ratio of (PA + GA) : (PG - GA)?**

- (a) 4 : 1
- (b) 3 : 1
- (c) 2 : 1
- (d) 3 : 2

**Q45. In a  $\Delta PQR$ , PD is the median and G is centroid. If PG = 24 cm, then what is the length (in cm) of PD?**

- (a) 48
- (b) 36
- (c) 60
- (d) 72

**Q46. The tangents drawn at the point P and Q of a circle centered at O meet at A. If  $\angle POQ = 120^\circ$ , then what is the ratio of  $\angle PAQ : \angle PAO$ ?**

- (a) 2 : 3
- (b) 4 : 1
- (c) 2 : 1
- (d) 5 : 2



**Q47.** ABCD is a trapezium, such that  $AB = CD$  and  $AD \parallel BC$ .  $AD = 10$  cm and  $BC = 18$  cm. If the area of ABCD is  $70 \text{ cm}^2$ , then what is the value (in cm) of CD?

- (a) 5
- (b)  $\sqrt{29}$
- (c)  $\sqrt{41}$
- (d) 6

**Q48.** The angle of elevation of the sun, when the length of the shadow of a tree  $\sqrt{3}$  times the height of the tree, is:

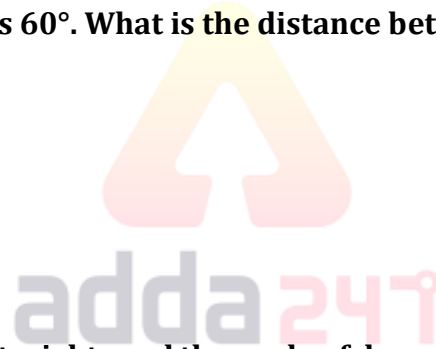
- (a)  $30^\circ$
- (b)  $45^\circ$
- (c)  $60^\circ$
- (d)  $90^\circ$

**Q49.** A man standing at a point P is watching the top of a tower, which makes an angle of elevation of  $30^\circ$  with then man's eye. The man walks some distance towards the tower to watch its top and the angle of the elevation becomes  $60^\circ$ . What is the distance between the base of the tower and the point P?

- (a)  $4\sqrt{3}$  units
- (b) 8 units
- (c) 12 units
- (d) data inadequate

**Q50.** From an aeroplane above a straight road the angle of depression of two positions at a distance 20 m apart on the road are observed to be  $30^\circ$  and  $45^\circ$ . The height of the aeroplane above the ground is:

- (a)  $10\sqrt{3}m$
- (b)  $10(\sqrt{3} - 1)m$
- (c)  $10(\sqrt{3} + 1)m$
- (d) 20m



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