AREAS RELATED TO CIRCLES

There are so many formulae in math. We cannot memorize all these; we should not even do this.
We have to learn firstly the concepts and, memorize the most important ones.

By O.P. GUPTA Math Mentor
INDIRA AWARD WINNER

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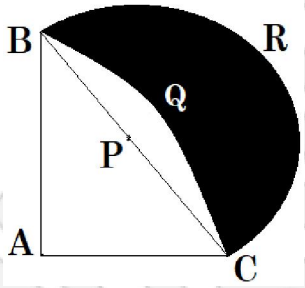
☆ Multiple Choice Questions, with **only** one correct option.

Q01. In the given figure, ABC is quadrant of radius 14 cm and a semicircle is drawn taking BC as the diameter. The area of the shaded region is:



(a) 102 cm^2 (b) 98 cm^2 (c) 89 cm^2 (d) 201 cm^2

Q02. If the biggest hand of a clock is 15 cm long, then the distance covered by it in 40 minutes will be:
(a) 31.5 cm (b) 72.8 cm (c) 24.1 cm (d) None of these

Q03. The area of a triangle whose sides are respectively 3, 4 and 5 (in cm) is:
(a) 6 cm^2 (b) 60 cm^2 (c) 30 cm^2 (d) 10 cm^2

Q04. The radius of circle is increased by 1 cm, then the ratio of the new circumference to the diameter is (if diameter of new circle is considered):
(a) $\pi:2$ (b) $\pi+1$ (c) $\pi:1$ (d) None of these

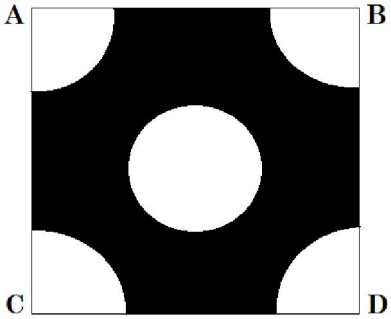
Q05. A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $6\sqrt{2}$ cm, then the area of the triangle is:
(a) $16\sqrt{2}$ cm^2 (b) $16\sqrt{3}$ cm^2 (c) $12\sqrt{2}$ cm^2 (d) None of these

Q06. The area of a circle inscribed in an equilateral triangle is 48π sq.units. Then the perimeter of triangle (in units) is given as:
(a) $72\sqrt{3}$ (b) 72 (c) $48\sqrt{3}$ (d) 36

Q07. The minute hand of a clock is $\sqrt{21}$ cm long. The area described by minute hand on the face of the clock between 7:00 am to 7:05 am is:
(a) 4.5 cm^2 (b) 6.6 cm^2 (c) 5.5 cm^2 (d) Can't be determined

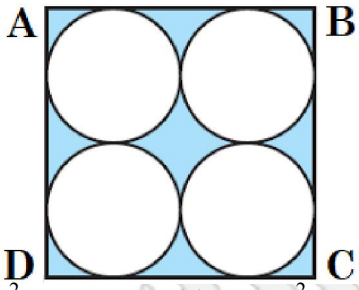
Q08. If the minute hands of two clocks are of length 3 cm and 4 cm respectively. The ratio of the areas in two clocks covered by the minute hands in $\frac{1}{2}$ hour will be:
(a) 9:16 (b) 4:9 (c) 16:9 (d) None of these

Q09. From each corner of a square of sides 4 cm a quadrant of a circle of a radius 1 cm is cut and also a circle of a diameter 2 cm is cut. The area of the remaining portion of the square is [See the figure]:



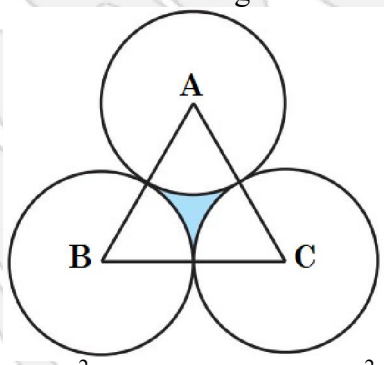
(a) 10.25 cm^2 (b) 9.72 cm^2 (c) 11.52 cm^2 (d) None of these

Q10. ABCD is a square of side length 14 cm, [See the figure]. The area of shaded region is:



(a) 42 cm^2 (b) 44 cm^2 (c) 46 cm^2 (d) Data incomplete

Q11. In the given figure [see the figure], the area of an equilateral triangle ABC is 17320.5 cm^2, with each vertex of the triangle taken as a centre, circle is drawn with radius equal to half the length of the side of the triangle. The area of the shaded region is:



(a) 1220.5 cm^2 (b) 1320.7 cm^2 (c) 1520.8 cm^2 (d) 1620.5 cm^2

Q12. If the side of a square is increased by 25%, then how much percent does its area get increased?
(a) 25.65% (b) 25.56% (c) 65.52% (d) 56.25%

Q13. If the side of a square is doubled, how does area of the square change?
(a) becomes four times (b) becomes three times
(c) becomes two times (d) None of these

Q14. The length and breadth of a rectangle is increased by 40% and 30% respectively. Then the area of the resulting rectangle exceeds the area of the original rectangle by:
(a) 42% (b) 62% (c) 82% (d) None of these

Q15. The diameter of a wheel is 63 cm. Distance traveled by the wheel in 100 revolutions is:
(a) 99 m (b) 198 m (c) 63 m (d) 136 m

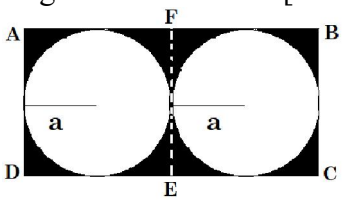
Q16. The radii of two circles are 8 cm and 6 cm. The radius of a circle having area equal to the sum of the areas of these two circles is:
(a) 12 cm (b) 15 cm (c) 10 cm (d) 19 cm

Q17. If radius of a circle is increased by 100%, then its area will be increased by:
(a) 400% (b) 200% (c) 300% (d) 250%

Q18. The perimeter of a semicircle of diameter 14 cm is:
(a) 36 cm (b) 42 cm (c) 44 cm (d) 58 cm

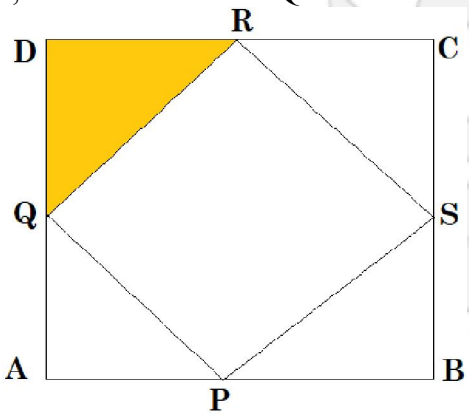
Q19. If two circles touch externally and distance between their centres is 14 cm and sum of their areas is 130π cm^2 then, the radii of two circles are:
(a) 11 cm , 3 cm (b) 8 cm, 6 cm (c) 12 cm, 2 cm (d)13 cm , 1 cm

Q20. The area of shaded portion in the figure shown below [See the figure], will be:



Assume ADEF and BCEF as two squares of same side-length.
(a) $2a^2(4-\pi)$ (b) $a^2(4-\pi)$ (c) $2a^2(8-\pi)$ (d) $2a(4a-\pi)$

Q21. In the given figure [See the figure given below] ABCD is a square. Also P, Q, R and S are the midpoints of sides as shown, then the area of ΔDQR will be:



(a) $\frac{1}{2}(\text{ar.ABCD})$ (b) $\frac{1}{4}(\text{ar.ABCD})$ (c) $\frac{1}{2^3}(\text{ar.ABCD})$ (d) $\frac{1}{2^4}(\text{ar.ABCD})$

Q22. The diagonals of a rhombus are of measures 16 cm and 10 cm, its area is:
(a) 64 cm^2 (b) 100 cm^2 (c) 80 cm^2 (d) 40 cm^2

Q23. The area of the sector of a circle with sector angle θ is:
(a) $\pi r^2\theta$ (b) $\frac{\pi r^2\theta}{360^\circ}$ (c) $\frac{2\pi r}{360^\circ}$ (d) None of these

Q24. The ratio of area of a square of side 'a' and equilateral triangle of side 'a', is:
(a) 2:1 (b) $2:\sqrt{3}$ (c) 4: 3 (d) $4:\sqrt{3}$

Q25. A rectangular sheet of cardboard is 4 cm by 2 cm. The greatest possible circle is cutoff form the cardboard then the remaining area is:
(a) $(16-\pi)$ cm^2 (b) $(16-4\pi)$ cm^2 (c) $(8-\pi)$ cm^2 (d) None of these

Q26. Sum of lengths of the diagonals of a square is 144 cm. The perimeter of the square is:
(a) $144\sqrt{2}$ cm (b) 144 cm (c) $144\sqrt{3}$ cm (d) None of these

Q27. The perimeter of a rectangle is 200 cm. If the ratio of its breadth and length is 3:5, its length is:
(a) 62.5 cm (b) 64.5 cm (c) 66.5 cm (d) 68.5 cm

Q28. The sides of a triangle are 5 cm, 12 cm and 13 cm. Its area is:
(a) 24 sq.cm (b) 28 sq.cm (c) 30 sq.cm (d) None of these

Q29. If the radius of a circle is reduced by 20%, its area is reduced by:
(a) 40% (b) 38% (c) 36% (d) 34%

Q30. The area of the sector of a circle of 14 cm diameter which subtends an angle of 36º at the centre is:
(a) 15.2 sq.cm (b) 15.4 sq.cm (c) 15.6 sq.cm (d) 15.8 sq.cm

Q31. There are two concentric circles of radius 5 cm and 13 cm. The length of the chord of the outer circle touching the inner circle is:
(a) 22 cm (b) 24 cm (c) 26 cm (d) 28 cm

Q32. The area of the sector of a circle of radius r and central angle α is:
(a) $\frac{1}{2}.\, l\, r$ (b) $\frac{2\pi r^2 \alpha}{720}$ (c) $\frac{2\pi r \alpha}{360}$ (d) $\frac{\pi r \alpha}{360}$

Q33. An arc of a circle is of length 5π cm and the sector it bounds has an area of 20π cm^2. Its radius is:
(a) 1 cm (b) 5 cm (c) 8 cm (d) 10 cm

Q34. A sector is cut from a circle of radius 21 cm. The angle of sector is 150^o, its area is:
(a) 577.5 cm^2 (b) 288.2 cm^2 (c) 152 cm^2 (d) 155 cm^2

Q35. A chord AB of a circle of radius 10 cm makes a right angle at the centre of circle. Then, area of major segment is:
(a) 210 cm^2 (b) 235.7 cm^2 (c) 185.5 cm^2 (d) 285.71 cm^2

Q36. A horse is tied to a pole with 56 m long rope. The area of the field where the horse can graze is:
(a) 2560 m^2 (b) 2464 m^2 (c) 9856 m^2 (d) 25600 m^2

Q37. Three horses are tied to 7 m rope at each of the corner of a triangular field whose sides are 20 m, 30 m and 40 m long. The total area that can be gazed by them is:
(a) 77 m^2 (b) 7.77 m^2 (c) 66 m^2 (d) 7.7 m^2

Q38. The circumferences of two circles are in the ratio 2:3. The ratio of their area is:
(a) 4:9 (b) 2:3 (c) 7:9 (d) 4:10

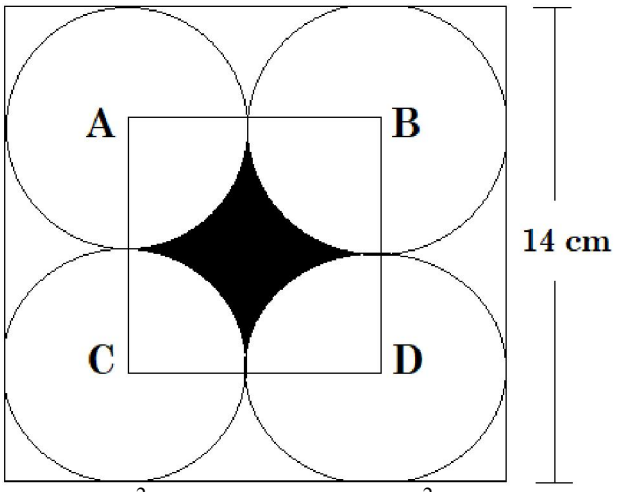
Q39. Area enclosed between two concentric circles is 770 cm^2. If the radius of outer circle is 21 cm, then radius of inner circle is:
(a) 12 cm (b) 13 cm (c) 14 cm (d) 15 cm

Q40. The perimeter of a semicircle protector is 72 cm. Its diameter is:
(a) 28 cm (b) 14 cm (c) 36 cm (d) 24 cm

Q41. The minute hand of a clock is 21 cm long. The area described by it on the face of clock in five minutes is:
(a) 115.5 cm^2 (b)112.5 cm^2 (c) 211.5 cm^2 (d) 123.5 cm^2

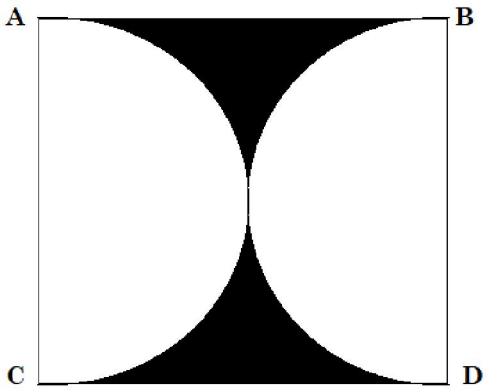
Q42. The area of a circle circumscribing a square of area 64 cm^2 is:
(a) 50.28 cm^2 (b) 25.5 cm^2 (c) 100.57 cm^2 (d) 75.48 cm^2

Q43. In the diagram [see the figure] shown below is a square of side 14 cm. With centers A, B, C, D four circles are drawn such that each circle touches externally two of the remaining three circles. Then the area of shaded region is:



(a) 24 cm^2 (b) 23 cm^2 (c) 32 cm^2 (d) None of these

Q44. In the figure [See the figure] ABCD is a square of side 14 cm, APD and BPC are semicircles. Then the area of the shaded region is:



(a) 32 cm^2 (b) 37 cm^2 (c) 42 cm^2 (d) 44 cm^2

Q45. A rectangular carpet has an area of 120 m^2 and a perimeter of 46 m. The length of its diagonal is:
(a) 15 m (b) 16 m (c) 17 m (d) 20 m

Q46. The area of an equilateral triangle is $24\sqrt{3}$ m^2. Its perimeter is:
(a) 96 m (b) $12\sqrt{3}$ m (c) $24\sqrt{3}$ m (d) None of these

Q47. If the diameter of a circle is increased by 100%, its area will increased by:
(a) 100% (b) 200% (c) 300% (d) 400%

Q48. The area of circle with the diameter d is:
(a) $2\pi d$ (b) $\frac{\pi d^2}{4}$ (c) πd^2 (d) None of these

Q49. If the circumference and area of a circle are numerically equal then, the radius of the circle is:
(a) 1 (b) 2 (c) 7 (d) None of these

Q50. The circumferences of two circles are in the ratio 4:5, the ratio of their areas is:
(a) 5:4 (b) 4:5 (c) 16:25 (d) None of these

Q51. A wire is in the form of a circle of radius 7 cm. It is bent into a square. The area of the square is:
(a) 11 cm^2 (b) 121 cm^2 (c) 154 cm^2 (d) 44 cm^2

ANSWERS KEY

Q01. b	Q02. d	Q03. a	Q04. c	Q05. b	Q06. b	Q07. c
Q08. a	Q09. b	Q10. a	Q11. d	Q12. d	Q13. a	Q14. c
Q15. b	Q16. c	Q17. c	Q18. a	Q19. a	Q20. a	Q21. c
Q22. c	Q23. b	Q24. d	Q25. c	Q26. a	Q27. a	Q28. c
Q29. c	Q30. b	Q31. b	Q32. b	Q33. c	Q34. a	Q35. d
Q36. c	Q37. a	Q38. a	Q39. c	Q40. a	Q41. a	Q42. a
Q43. d	Q44. c	Q45. c	Q46. b	Q47. c	Q48. b	Q49. b
Q50. c	Q51. b					

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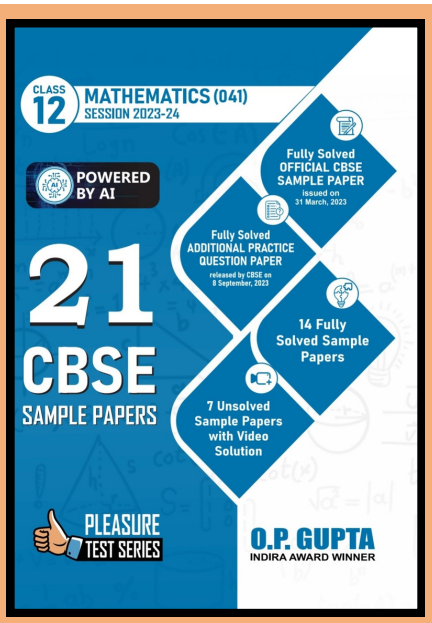

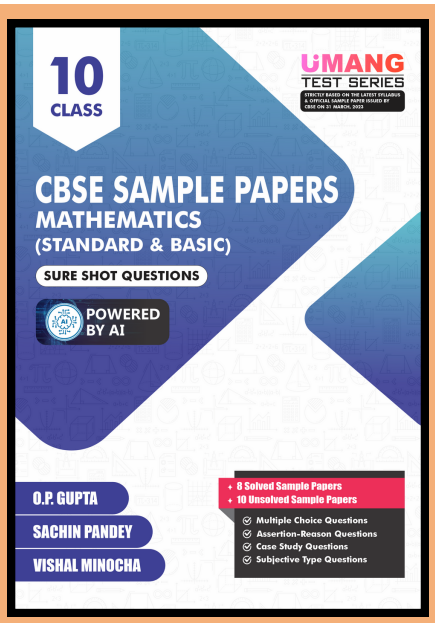

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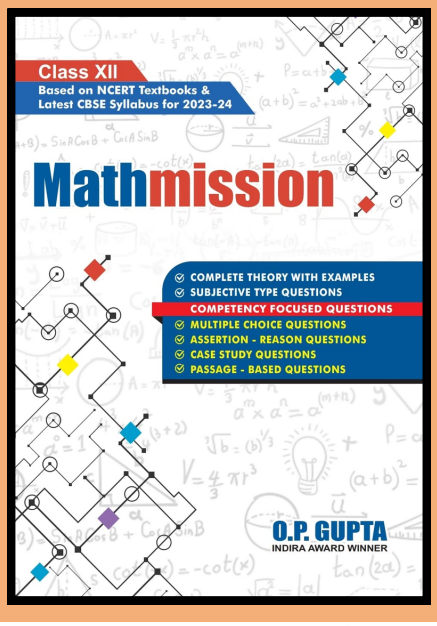

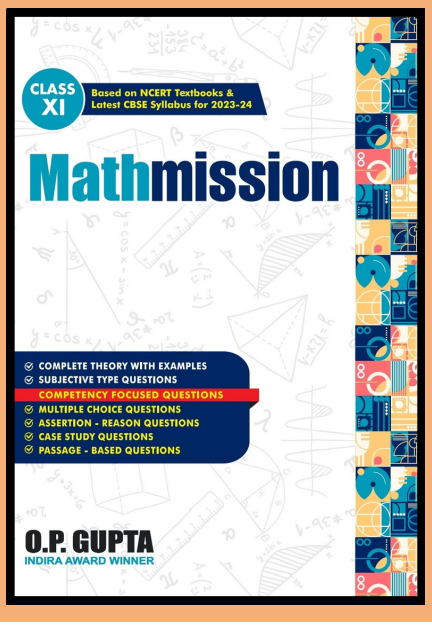

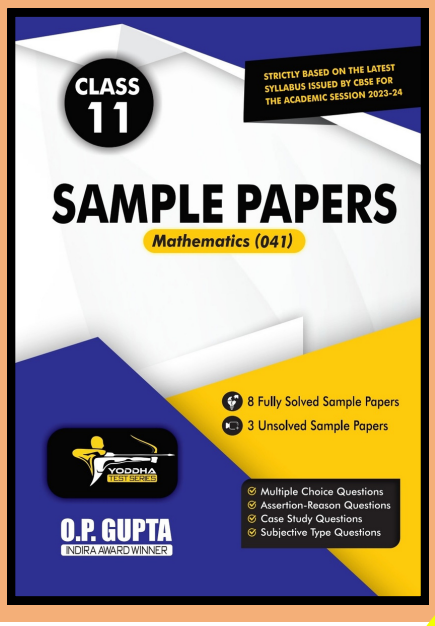

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