

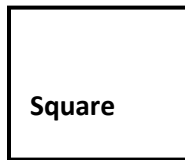
QUANTITATIVE APTITUDE

PART-II

CAREER  SUCCESS
सरकारी नौकरी पाना अब आसान
GOVT JOBS MADE EASY

CHAPTER	<h1>MESURATION</h1>
1	

SQUARE



Side (S)

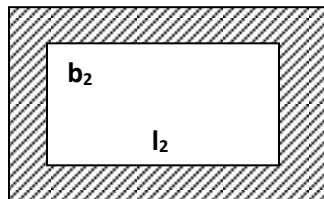
- Area = side × side = (S)²
- $S = \sqrt{\text{Area}}$
- Perimeter = 4 (side)
- Diagonal = (side) × $\sqrt{2}$

RECTANGLE



Length (l)

- Area = l × b
- Perimeter = 2 (l + b)
- Diagonal = $\sqrt{l^2 + b^2}$

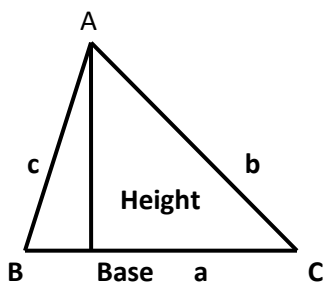


l₁

b₁

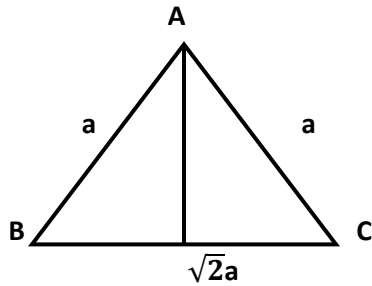
- Area of track = l₁ b₁ – l₂ b₂

Triangle



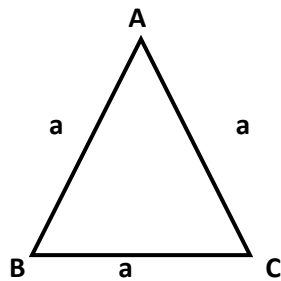
- Area = $\frac{1}{2}$ × base × height
- Perimeter = $\sqrt{s(s-a)(s-b)(s-c)}$
Where, s = semi-perimeter = $\frac{a+b+c}{2}$

Area and perimeter of Right angled Isosceles Triangle



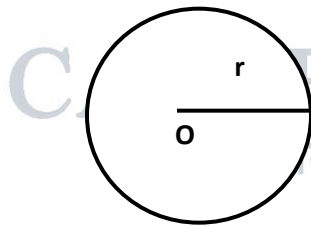
Area of equilateral Triangle

- Area = $\frac{1}{2} a^2$
- Perimeter = $(2a + \sqrt{2}a)$
- Height = $\frac{a}{\sqrt{2}}$



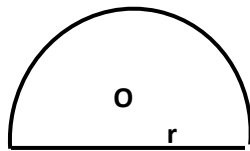
- Area = $\frac{\sqrt{3}}{4} \times (\text{side})^2 = \frac{\sqrt{3}}{4} a^2$
- Altitude = $\frac{\sqrt{3}}{2} \times \text{side} = \frac{\sqrt{3}}{2} a$
- Perimeter = $3 \times \text{side} = 3a$

Circle



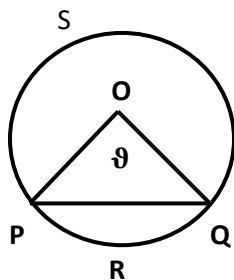
- Circumference = $2\pi r = \pi D$
- Area = $\frac{\pi}{4} D^2$

Semi- Circle



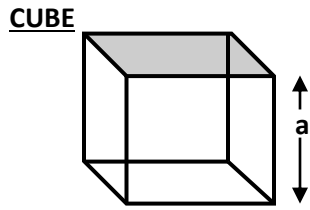
- Area of semi-circle = $\frac{1}{2} \pi r^2$
- Perimeter of semi-circle = $\pi r + 2r = \pi r + D$

Area of sector

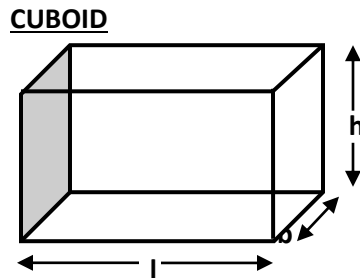


- If θ be the angle at the centre of a circle of radius r
- Length of the arc PQ = $2\pi r \times \frac{\theta}{360}$
- Area of sector OPRQ = $\pi r^2 \times \frac{\theta}{360}$

Volume

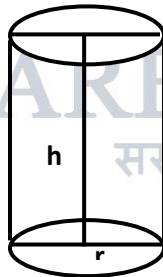


- edge of cube = length = breadth = height = a
- Volume of cube = (edge)² = a²
- Total surface area = 6 × (edge)² = 6a²
- Diagonal of a cube = $\sqrt{3} \times \text{edge} = \sqrt{3}a$



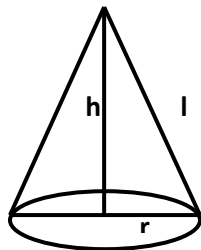
- $V = l \times b \times h$
- Surface area = 2 (lb + bh + hl)
- Diagonal = $\sqrt{l^2 + b^2 + h^2}$

Right Circular Cylinder



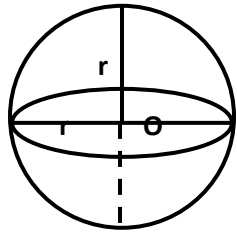
- Volume = $\pi r^2 h$
- Curved surface area = $2\pi r h$
- Total surface area = $2\pi r h + 2\pi r^2 = 2\pi r(r+h)$

Right Circular Cone



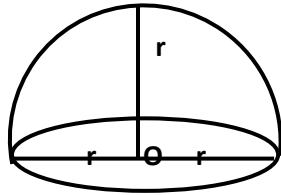
- Volume = $\frac{1}{3} \pi r^2 h$
- Curved Surface area = $\pi r l$
- Total surface Area = $\pi r l + \pi r^2 = \pi r (l + r)$

SPHERE



- Volume = $\frac{4}{3}\pi r^3$
- Surface Area = $4\pi r^2$

Hemi-Sphere



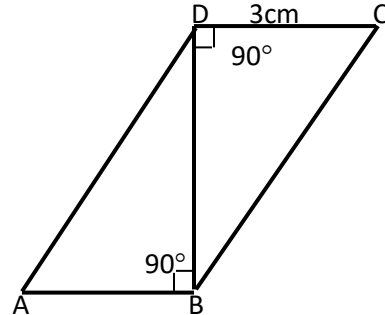
- Volume = $\frac{2}{3}\pi r^3$
- Surface Area = $2\pi r^2$
- Total Surface Area = $2\pi r^2 + \pi r^2 = 3\pi r^2$



QUESTIONS

1. A cistern 6 m long and 4 m wide contains water up to a depth of 1 m 25 cm. The total area of the wet surface is?
(a) 49 m^2 (b) 50 m^2 (c) 53.5 m^2
(d) 55 m^2 (e) None of these
2. The breadth of a room is twice its height and half its length. The volume of the room is 512 cu. m. The length of the room is
(a) 16 m (b) 18 m (c) 20 m
(d) 32 m (e) None of these
3. A Rectangular plot is 180 m^2 in area. If its length is 18m then, its perimeter is?
(a) 20 m (b) 56 m (c) 360 m
(d) 60 m (e) None of these
4. The side of a square exceeds the side of another square by 4 cm and the sum of the areas of the two squares is 400 cm^2 . The dimensions of the square are?
(a) 8cm and 12cm (b) 6cm and 10cm
(d) 12cm and 16cm (d) 10cm and 18cm
(e) None of these
5. The area of the floor of a rectangular hall of length 40m is 960 m^2 . Carpets of size $6 \text{ m} \times 4 \text{ m}$ are available. Then, how many carpets are required to cover the hall?
(a) 20 (b) 30 (c) 40
(d) 45 (e) None of these
6. A lawn is in the shape of rectangle of length 60m and width 40m. Inside the lawn there is a footpath of uniform width 1m bordering the lawn. The area of the path is:
(a) 194 m^2 (b) 196 m^2 (c) 198 m^2
(d) 200 m^2 (e) None of these

7. ABCD is a parallelogram as shown in figure, then its area is?



- (a) 12 cm^2 (b) 14 cm^2 (c) 15 cm^2
(d) 660 cm^2 (e) None of these
8. What is the area of a triangle whose sides are 9cm, 12cm and 15cm?
(a) 45 cm^2 (b) 54 cm^2 (c) 56 cm^2
(d) 64 cm^2 (e) None of these
9. What is the perimeter of an equilateral triangle whose area is $4\sqrt{3} \text{ cm}^2$?
(a) 4cm (b) 3cm (c) 12cm
(d) 7cm (e) None of these
10. The circumference of a circle whose area is 24.64 m^2 is
(a) 17.2m (b) 17.4m (c) 17.6m
(d) 18.0m (e) None of these
11. If the radius of a circle is decreased by 20%, then the percentage decrease in its area is?
(a) 26% (b) 32% (c) 36%
(d) 53% (e) None of these
12. If the perimeter of a semi-circular protractor is 36cm, then its diameter is?
(a) 6 cm (b) 7 cm (c) 7.5 cm
(d) 14 cm (e) None of these
13. The ratio of the area of the incircle and circumcircle of a square are?
(a) 1:1 (b) 2:1 (c) 1:2
(d) 3:1 (e) None of these

14. The diagonal of a square of field measures 50m. The area of square field is?
(a) 1250 m^2 (b) 1200 m^2 (c) 1205 m^2
(d) 1025 m^2 (e) None of these
15. The circumference of a circle is 176m. Then the area is
(a) 2464 m^2 (b) 2164 m^2 (c) 2346 m^2
(d) 2246 m^2 (e) None of these
16. In a circle of radius 42 cm, an arc subtends an angle of 72° at the center. The length of the arc is
(a) 52.8 cm (b) 53.8 cm (c) 72.8 cm
(d) 79.8 cm (e) None of these
17. An isosceles right angle triangle has area 200 cm^2 . Then length of its hypotenuse is
(a) $15\sqrt{2} \text{ cm}$ (b) $\frac{10}{\sqrt{2}} \text{ cm}$ (c) $10\sqrt{2}$

- (d) $20\sqrt{2} \text{ cm}$ (e) None of these
18. The least number of square slabs that can be fitted in a room of 10.5 m long and 3 wide, is?
(a) 12 tiles (b) 13 tiles (c) 14 tiles
(d) 15 tiles (e) None of these
19. The length of a rectangle is 2 cm more than its breadth. The perimeter is 48 cm. The area of the rectangle (in cm^2) is?
(a) 96 cm^2 (b) 128 cm^2 (c) 143 cm^2
(d) 144 cm^2 (e) None of these
20. The cost of leveling a rectangular ground at Rs. 1.25 per sq. meter is Rs. 900. If the length of the ground is 30 meters, then the width is?
(a) 330 meters (b) 34 meters (c) 24 meters
(d) 18 meters (e) None of these



ANSWERS

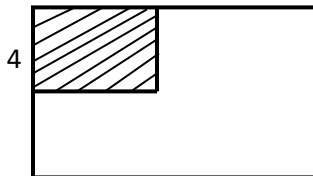
1. (a): Area of the wet surface = $[2(lb + bh + lh) - lb]$
 $= 2(bh + lh) + lb$
 $= [2(4 \times 1.25 + 6 \times 1.25) + 6 \times 4] \text{ m}^2 = 49 \text{ m}^2$

2. (a): Let the height of the room be x meters.
 Then, breadth = $2x$ metres and length = $4x$ metres
 \therefore Volume of the room = $(4x \times 2x \times x) \text{ m}^3 = (8x^3) \text{ m}^3$
 $8x^3 = 512 \Rightarrow x^3 = 64 \Rightarrow x = 4$
 Length of the room is 16 m

3. (b): Breadth = $\frac{\text{Area}}{\text{Length}} = \frac{180}{18} = 10 \text{ m}$
 \therefore Perimeter = $2(\text{length} + \text{breadth}) = 2(18 + 10) = 56$

4. (c): Let side of square = x cm
 Side of another square = $(x+4)$ cm
 $\therefore x^2 + (x+4)^2 = 400$
 $x^2 + x^2 + 16 + 8x = 400$
 $2x^2 + 8x - 384 = 0 \Rightarrow x^2 + 4x - 192 = 0$
 $x^2 + 16x - 12x - 192 = 0$
 $x(x+16) - 12(x+16) = 0$
 $(x-12)(x+16) = 0$
 $\therefore x = 12$ (-16 not possible)
 \therefore Side of one square = 12 cm
 Side of another square = 16 cm

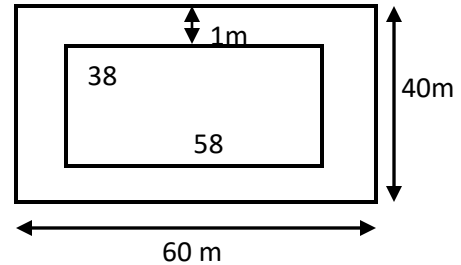
5. (c): Given, 6



Area of the floor = 960 m^2
 Area of one carpet = $6 \times 4 = 24 \text{ m}^2$
 \therefore No of carpet required = $\frac{\text{Area of floor}}{\text{Area of one carpet}}$

$= \frac{960}{24} = 40$

6. (b): Length of the outer rectangle = 60 m



Breadth of the outer rectangle = 40 m
 Area = $60 \times 40 = 2400 \text{ m}^2$
 Width of path = 1 m
 Length of the inner rectangle = $60 \text{ m} - (1+1) \text{ m} = 58 \text{ m}$
 Breadth of the inner rectangle = $40 - 2 = 38 \text{ m}$
 \therefore Area = $58 \times 38 = 2204 \text{ m}^2$

Area of path = [Area of outer rectangle] - [Area of inner rectangle]
 $= 2400 - 2204 = 196 \text{ m}^2$

7. (a): Area of parallelogram, ABCD = (Area of Δ ABD + Area of Δ BDC)

$= 2(\text{Area of } \Delta$ ABD)
 $= 2 \times \frac{1}{2} \times 3 \times 4 = 12 \text{ cm}^2$

8. (b): Here, $s = \frac{9+12+15}{2} = 18 \text{ cm}$

Area = $\sqrt{s(s-a)(s-b)(s-c)}$
 $= \sqrt{18(18-9)(18-12)(18-15)}$
 $= \sqrt{18 \times 9 \times 6 \times 3} = 54 \text{ cm}^2$

9. (c): By formula

Area = $\frac{\sqrt{3}}{4} \times (\text{side})^2 \Rightarrow \frac{\sqrt{3}}{4} \times (\text{side})^2 = 4\sqrt{3}$
 $(\text{side})^2 = 16 \Rightarrow \text{side} = 4 \text{ cm}$

$$\therefore \text{Perimeter} = 3 \times \text{side} = 3 \times 4 = 12 \text{ cm}$$

10. (c): Let, radius of the circle = r m

$$\pi r^2 = 24.64$$

$$\frac{22}{7} \times r^2 = 24.64 \Rightarrow r^2 = \frac{7 \times 24.64}{22}$$

$$r = \sqrt{\frac{7 \times 24.64}{22}} = 2.8$$

Thus, circumference = $2\pi r$

$$= 2 \times \frac{22}{7} \times 2.8 = 17.6 \text{ m}$$

11. (c): Let initial radius of circle = r

$$\text{Now new radius} = 80\% \text{ of } r = r \times \frac{80}{100} = \frac{4r}{5}$$

$$\text{Initial area} = \pi r^2$$

$$\text{New area} = \pi \left(\frac{4r}{5}\right)^2 = \frac{16}{25} \pi r^2$$

$$\text{Decrease in Area} = \left(\pi r^2 - \frac{16}{25} \pi r^2\right) =$$

$$\frac{9}{25} \pi r^2$$

$$\text{Percentage decrease} = \frac{\frac{9}{25} \pi r^2}{\pi r^2} \times 100$$

$$= \frac{9}{25} \times 100 = 9 \times 4 = 36\%$$

Shortcut:

$$\% = x + y + \frac{xy}{100}$$

$$= -20 - 20 + \frac{(-20)(-20)}{100}$$

$$= -40 + 4 = 36\% \text{ (-ve sign show \% decrease)}$$

12. (d): Let the radius of the protractor = r cm

$$\text{Perimeter} = (\pi r + 2r) = (\pi + 2)r = 36$$

$$\therefore \frac{36}{7} r = 36 \Rightarrow r = 7 \text{ cm}$$

$$\therefore \text{Diameter of the protractor} = 2 \times 7 =$$

$$14 \text{ cm}$$

13. (c): Let side of square = x

$$\text{Diagonal} = \sqrt{2}x$$

$$\text{Radius of incircle} = \frac{x}{2}$$

$$\text{Radius of circumcircle} = \frac{\sqrt{2}x}{2} = \frac{x}{\sqrt{2}}$$

$$\text{Required ratio} = \left(\frac{\pi r^2}{4} : \frac{\pi x^2}{2}\right) = 2 : 4 = 1 :$$

2

14. (a): Given diagonal of square = 50 m

$$\sqrt{2} \times \text{side} = 50 \quad \text{side} = \frac{50}{\sqrt{2}}$$

$$\text{Area} = \text{side}^2 \left(\frac{50}{\sqrt{2}}\right)^2 = \frac{2500}{2} = 1250 \text{ m}^2$$

15. (a): Given, circumference ($2\pi r$) = 176

$$r = \frac{176}{2 \times 22} \times 7 \Rightarrow r = \frac{8 \times 7}{2} \Rightarrow r = 28 \text{ m}$$

$$\text{Area} = \pi r^2 = \frac{22}{7} \times 28 \times 28 = 2464 \text{ m}^2$$

16. (a): Length of the arc = $2\pi r \times \frac{\theta}{360}$

$$= 2\pi \times 42 \times \frac{72}{360} = 2 \times \frac{22}{7} \times 42 \times$$

$$\frac{72}{360} = 52.8 \text{ cm}$$

17. (d): Area of isosceles triangle wide side

$$(a) \frac{1}{2} a^2$$

$$\therefore 200 = \frac{1}{2} a^2 \Rightarrow a^2 = 400 \Rightarrow a = 20$$

cm

$$\therefore \text{Hypotenuse} = \sqrt{a^2 + a^2} = \sqrt{2} \cdot a$$

$$= \sqrt{2} \times 20 = 20\sqrt{2} \text{ cm}$$

18. (c): Side of greatest square title.

= GCM of length and breadth of the room

$$= \text{GCM of } 10.5 \text{ and } 3 = 1.5 \text{ cm}$$

$$\text{Area of room} = 10.5 \times 3 \text{ m}$$

$$\text{No. of titles needed} = \frac{10.5 \times 3}{1.5 \times 1.5} = \frac{10.5 \times 3}{2.25} =$$

$$14 \text{ titles}$$

19. (c): Let breadth = x cm

$$\therefore \text{Length} = (x+2) \text{ cm}$$

$$\therefore 2(x+x+2) = 48 \Rightarrow 2(2x+2) = 48$$

$$2x+2=24 \Rightarrow 2x=22 \Rightarrow x=11 \text{ cm}$$

$$\therefore \text{Area} = 11 \times (11+2) = 11 \times 13 = 143 \text{ cm}^2$$

20. (c): Area of ground = $\frac{900}{1.25} = 720 \text{ m}^2$

$$\therefore \text{Length} \times \text{width} = 720 \Rightarrow \text{width} = \frac{720}{30} =$$

$$24 \text{ m}$$