Board – CBSE	Class – 7th	Topic – Mensuration

Q.1 Find the area of the rectangle whose dimensions are: length = 24.5 m, breadth = 18 m

Ans: Length = 24.5 m

Breadth = 18 m

∴ Area of the rectangle = Length × Breadth

= 24.5 m × 18 m

= 441 m^2

Q.2 The sides of a rectangular park are in the ratio 4: 3. If its area is 1728 m^2, find the cost of fencing it at Rs 30 per meter.

Ans: Let the length of the field be 4x m.

Breadth = 3x m

∴ Area of the field = (4x × 3x) m^2 = $12x^2$ m^2

But it is given that the area is 1728 m^2.

∴ $12x^2 = 1728$

$\Rightarrow x^2 = \left(\frac{1728}{12}\right) = 144$

$\Rightarrow x = \sqrt{144} = 12$

∴ Length = (4 × 12) m = 48 m

Breadth = (3 × 12) m =36 m

∴ Perimeter of the field = 2(l + b) units

= 2(48 + 36) m

= (2 × 84) m = 168 m

∴ Cost of fencing = Rs (168 × 30)

= Rs 5040

Q.3 The area of a rectangular field is 3584 m^2 and its length is 64 m. A boy runs around the field at the rate of 6 km/h. How long will he take to go 5 times around it?

Ans: Area of the rectangular field = 3584 m^2

Length of the rectangular field = 64 m

$Breadth\ of\ the\ rectangular\ field = \left(\frac{Area}{Length}\right) = \left(\frac{3584}{64}\right)m = 56\ m$

Perimeter of the rectangular field = 2 (length + breadth)

= 2(64+ 56) m = (2 × 120) m = 240 m

Distance covered by the boy = 5 × Perimeter of the rectangular field

= 5 × 240 = 1200 m

The boy walks at the rate of 6 km/hr.

Or

$Rate = \left(\frac{6\times1000}{60}\right) m/min = 100\ m/min$

$\therefore Required\ time\ to\ cover\ a\ distance\ of\ 1200\ m = \left(\frac{12000}{100}\right)min = 12\ min$

Hence, the boy will take 12 minutes to go five times around the field.

Q.4 Find the length of the largest pole that can be placed in a hall 10 m long, 10 m wide and 5 m high.

Ans: Length of the diagonal of the room = $\sqrt{l^2 + b^2 + h^2}$

$= \sqrt{(10)^2 + (10)^2 + (5)^2}\ m$

$= \sqrt{100 + 100 + 25}\ m$

$= \sqrt{225}\ m = 15\ m$

Hence, length of the largest pole that can be placed in the given hall is 15 m.

Q.5 Find the area of the square, the length of whose diagonal is 72 cm

Ans: Diagonal of the square = 72 cm

$\therefore Area\ of\ the\ square = \left[\frac{1}{2} \times (Diagonal)^2\right] sq.unit$

$= \left[\frac{1}{2} \times (72)^2\right] cm^2$

$= 2592\ cm^2$

Q.6 A room is 8.5 m long, 6.5 m broad and 3.4 m high. It has two doors, each measuring (1.5 m by 1 m) and two windows, each measuring (2 m by 1 m). Find the cost of painting its four walls at Rs 160 per m^2.

Ans: Length = 8.5 m

Breadth = 6.5 m

Height = 3.4 m

Area of the four walls = {2(l + b) × h} sq. units

= {2(8.5 + 6.5) × 3.4}m^2 = {30 × 3.4} m^2 = 102 m^2

Area of one door = (1.5 × 1) m^2 = 1.5 m^2

∴ Area of two doors = (2 × 1.5) m^2 = 3 m^2

Area of one window = (2 × 1) m^2 = 2 m^2

∴ Area of two windows = (2 × 2) m^2 = 4 m^2

Total area of two doors and two windows = (3 + 4) m^2

= 7 m^2

Area to be painted = (102 - 7) m^2 = 95 m^2

Rate of painting = Rs 160 per m^2

Total cost of painting = Rs (95 × 160) = Rs 15200

Q.7 The base of a parallelogram measures 1 m 60 cm and its height is 75 cm. Find its area in m^2.

Ans: Base = 1 m 60 cm = 1.6 m [since 100 cm = 1 m]

Height = 75 cm = 0.75 m

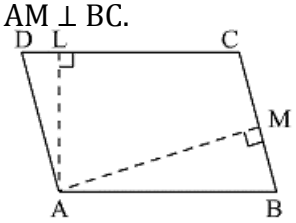
∴ Area of the parallelogram = Base × Height

= 1.6 m × 0.75 m

= 1.2 m^2

Q.8 In a parallelogram ABCD, AB = 18 cm, BC = 12 cm. AL ⊥ DC and AM ⊥ BC.

If AL = 6.4 cm, find the length of AM.



Ans: Base, AB = 18 cm

Height, AL = 6.4 cm

∴ Area of the parallelogram ABCD = Base × Height

= (18 cm × 6.4 cm) = 115.2 cm^2 ... (i)

Now, taking BC as the base:

Area of the parallelogram ABCD = Base × Height

= (12 cm × AM) ... (ii)

From equation (i) and (ii):

12 cm × AM = 115.2 cm^2

$\Rightarrow AM = \left(\frac{115.2}{12}\right)cm$

$= 9.6\ cm$

Q.9 Find the area of an equilateral triangle each of whose sides measures 18 cm [Take $\sqrt{3} = 1.73$]

Ans: Side of the equilateral triangle = 18 cm

$Area\ of\ the\ equilateral\ triangle = \frac{\sqrt{3}}{4}(Side)^2\ sq.units$

$= \frac{\sqrt{3}}{4}(18)^2 cm^2$

$= \left(\sqrt{3}\times 81\right)cm^2$

$= (1.73\times 81)cm^2$

$= 140.13\ cm^2$

Q.10 How long will a man take to make a round of a circular field of radius 21 m, cycling at the speed of 8 km/h?

Ans: Radius of the circular field, r = 21 m.

Distance covered by the cyclist = Circumference of the circular field

= 2πr

$= \left(2\times\frac{22}{7}\times 21\right)m = 132\ mSpeed\ of\ the\ cyclist = 8\ km\ per\ hour = \frac{8000\ m}{(60\times 60)s} = \frac{\left(\frac{8000}{3600}\right)m}{s}$

$= \frac{\left(\frac{20}{9}\right)m}{s}$

$Time\ taken\ by\ the\ cyclist\ to\ cover\ the\ field = \frac{Distance\ covered\ by\ the\ cyclist}{Speed\ of\ the\ cyclist}$

$= \left[\frac{132}{\left(\frac{20}{9}\right)}\right]s$

$= \left(\frac{132\times9}{20}\right)s$

$= 59.4\ s$

Q.11 A wire in the form of a rectangle 18.7 cm long and 14.3 cm wide is reshaped and bent into the form of a circle. Find the radius of the circle so formed.

Ans: Length of the wire = Perimeter of the rectangle

$= 2(l + b) = 2 \times (18.7 + 14.3)$ cm $= 66$ cm

Let the wire be bent into the form of a circle of radius r cm.

Circumference of the circle = 66 cm

$\Rightarrow 2\pi r = 66$

$\Rightarrow \left(2\times\frac{22}{7}\times r\right) = 66$

$\Rightarrow r = \left(\frac{66\times7}{2\times22}\right) cm = 10.5\ cm$

Hence, the radius of the circle formed is 10.5 cm.

Q.12 The hour and minute hands of a clock are 4.2 cm and 7 cm long respectively. Find the sum of the distances covered by their tips in 1 day.

Ans: Length of the hour hand (r)= 4.2 cm.

$Distance\ covered\ by\ the\ hour\ hand\ in\ 12\ hours = 2\pi r$

$= \left(2\times\frac{22}{7}\times4.2\right)cm = 26.4\ cm$

∴ Distance covered by the hour hand in 24 hours = $(2 \times 26.4) = 52.8$ cm

Length of the minute hand (R)= 7 cm

$Distance\ covered\ by\ the\ minute\ hand\ in\ 1\ hour = 2\pi R$

$= \left(2\times\frac{22}{7}\times7\right)cm = 44\ cm$

∴ Distance covered by the minute hand in 24 hours = (44×24) cm

$= 1056$ cm

∴ Sum of the distances covered by the tips of both the hands in 1 day = (52.8 + 1056)cm

= 1108.8 cm

Q.13 The diameter of the wheel of a cycle is 70 cm. How far will it go in 250 revolutions?

Ans: It may be noted that in one revolution, the cycle covers a distance equal to the circumference of the wheel.

Diameter of the wheel = 70 cm

$\therefore Circumference\ of\ the\ wheel = \pi d = \left(\frac{22}{7} \times 70\right) cm = 220\ cm$

Thus, the cycle covers 220 cm in one revolution.

∴ Distance covered by the cycle in 250 revolutions = (220 × 250) cm

= 55000 cm

= 550 m [since 1 m = 100 cm]

Hence, the cycle will cover 550 m in 250 revolutions.

Q.14 A bicycle wheel makes 5000 revolutions in moving 11 km. Find the circumference and the diameter of the wheel.

Ans: It may be noted that in one revolution, the bicycle covers a distance equal to the circumference of the wheel.

Total distance covered by the bicycle in 5000 revolutions = 11 km

⇒ 5000 × Circumference of the wheel = 11000 m [since 1 km = 1000 m]

$Circumference\ of\ the\ wheel = \left(\frac{11000}{5000}\right) m = 2.2\ m = 220\ cm$ $[since\ 1\ m = 100\ cm$

Circumference of the wheel = π × Diameter of the wheelπ×Diameter of the wheel

$\Rightarrow 220\ cm = \frac{22}{7} \times Diameter\ of\ the\ wheel$

$\Rightarrow Diameter\ of\ the\ wheel = \left(\frac{220 \times 7}{22}\right) cm = 70\ cm$

Hence, the circumference of the wheel is 220 cm and its diameter is 70 cm.

Q.15 The ratio of the radii of two circles is 4: 5. Find the ratio of their areas.

Ans: Let r_1 and r_2 be the radii of the two given circles and A_1 and A_2 be their respective areas.

$$\frac{R_1}{r_2} = \frac{4}{5}$$

$$\therefore \frac{A_1}{A_2} = \frac{\pi r_1^2}{\pi r_2^2} = \frac{r_1^2}{r_2^2} = \left(\frac{r_1}{r_2}\right)^2$$

$$= \left(\frac{4}{5}\right)^2$$

$$= \frac{16}{25}$$

Hence, the ratio of the areas of the given circles is 16:25.