



CREST Mathematics Olympiad (CMO) Worksheet *for* Class 8



Topic
Mensuration



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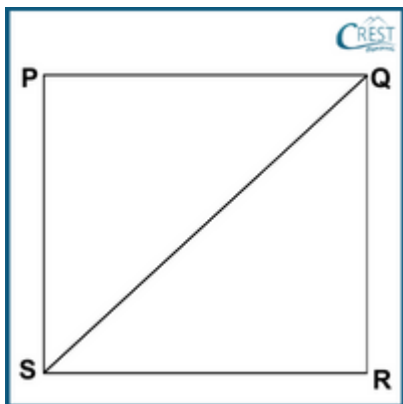
Worksheet on Mensuration

1. What is the area of a square PQRS if the length of QS is 8.6 cm?
 - a. 36.98 cm^2
 - b. 64.98 cm^2
 - c. 73.96 cm^2
 - d. 96.98 cm^2
2. The cuboidal hall is 7.2 metres long, 5 metres broad and 3.5 metres high. If it costs \$0.25 to whitewash 1 dm^2 , what is the cost of whitewashing the four walls and the ceiling?
 - a. \$3015
 - b. \$3025
 - c. \$3035
 - d. \$3045
3. An aluminium pipe 16.1 m long has an outer radius of 6.5 cm and an inner radius of 4.5 cm. What is the volume of aluminium used to make the pipe?
 - a. 0.11132 m^3
 - b. 1.11320 m^3
 - c. 11.1320 m^3
 - d. 111.320 m^3
4. What is the area of an isosceles triangle in square metres if an altitude drawn to the base of a triangle is 30 cm and the perimeter is 80 cm.
 - a. 0.003 m^3
 - b. 0.03 m^3
 - c. 0.30 m^3
 - d. 3 m^3
5. The difference between two parallel sides of a trapezium is 7 cm. What are the lengths of the parallel sides if the area of the trapezium is 402.5 cm^2 and the perpendicular distance between them is 17.5 cm?
 - a. 17.5 cm and 26.5 cm
 - b. 17.5 cm and 27.5 cm
 - c. 19.5 cm and 26.5 cm
 - d. 19.5 cm and 27.5 cm

Answer Key

1. a - 36.98 cm^2

Explanation: A square PQRS with diagonal QS is shown as:



Length of diagonal QS = 8.6 cm

$$\Rightarrow a\sqrt{2} = 8.6 \text{ cm} \text{ [Diagonal (d) of a square} = a\sqrt{2}]$$

$$\Rightarrow a = 8.6/\sqrt{2} \text{ cm}$$

Area of a square = a^2

$$= (8.6/\sqrt{2})^2$$

$$= (8.6)^2/2$$

$$= (8.6 \times 8.6)/2$$

$$= 36.98 \text{ cm}^2$$

2. c - \$3035

Explanation: Area of four walls of a cuboidal hall + Area of a ceiling of a cuboidal hall

$$= 2(l + b)h + lb$$

$$= [2 \times (7.2 + 5) \times 3.5] + [7.2 \times 5]$$

$$= [2 \times 12.2 \times 3.5] + [7.2 \times 5]$$

$$= 85.4 + 36$$

$$= 121.4 \text{ m}^2$$

$$= 121.4 \text{ m}^2 \times 100 \text{ [1 m}^2 = 100 \text{ dm}^2]$$

$$= 12140 \text{ dm}^2$$

$$\text{Costs of whitewash } 1 \text{ dm}^2 = \$0.25$$

$$\begin{aligned} \text{Costs of whitewash } 12140 \text{ dm}^2 &= \$0.25 \times 12140 \text{ dm}^2 \\ &= \$3035 \end{aligned}$$

3. a - 0.11132 m^3

Explanation: Pipe is cylinder in shape.

Height of a pipe = 16.1 m

$$= (161/10) \times 100 \text{ cm [1 m} = 100 \text{ cm]}$$

$$= 1610 \text{ cm}$$

Outer radius = 6.5 cm

Inner radius = 4.5 cm

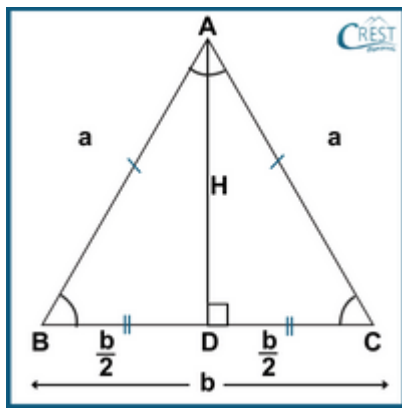
Volume of aluminium used to make the pipe = outer volume – inner volume

$$= \pi R^2 h - \pi r^2 h$$

$$\begin{aligned}
&= \pi(R^2 - r^2)h \\
&= \frac{22}{7} \times [(6.5)^2 - (4.5)^2] \times 1610 \\
&= \frac{22}{7} \times [(6.5 + 4.5)(6.5 - 4.5)] \times 1610 \\
&= \frac{22}{7} \times (11 \times 2) \times 1610 \\
&= \frac{22}{7} \times 22 \times 1610 \\
&= 484 \times 230 \\
&= 111320 \text{ cm}^3 \\
&= 111320 \times 1 \text{ cm} \times 1 \text{ cm} \times 1 \text{ cm} \\
&= 111320 \times \frac{1}{100} \text{ m} \times \frac{1}{100} \text{ m} \times \frac{1}{100} \text{ m} \\
&= 0.111320 \text{ m}^3
\end{aligned}$$

4. b - 0.03 m³

Explanation: An isosceles triangle ABC is shown as



Base (b) of an isosceles triangle = 30 cm

Perimeter of an isosceles triangle = 80 cm

$$\Rightarrow 2a + b = 80$$

$$\Rightarrow 2a + 30 = 80$$

$$\Rightarrow 2a = 80 - 30$$

$$\Rightarrow 2a = 50$$

$$\Rightarrow a = 25 \text{ cm}$$

In $\triangle ABD$,

Using Pythagoras theorem,

Area of a triangle = $\frac{1}{2} \times b \times h$

$$= \frac{1}{2} \times 30 \times 20$$

$$= 300 \text{ cm}^2$$

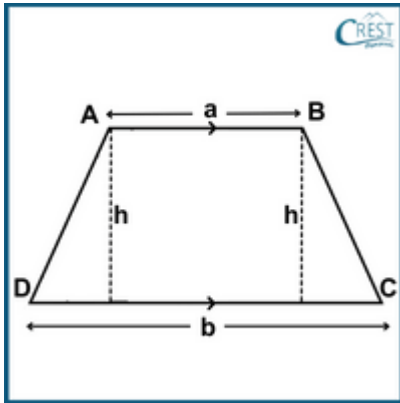
$$= 300 \times 1 \text{ cm} \times 1 \text{ cm}$$

$$= 300 \times (1 \div 100) \text{ m} \times (1 \div 100) \text{ m} \text{ [1 cm = 1/100 m]}$$

$$= 0.03 \text{ m}^3$$

5. c - 19.5 cm and 26.5 cm

Explanation: The trapezium with parallel sides is shown as



Let smaller side be a cm.

Difference between two parallel sides of a trapezium = 7 cm

$$\Rightarrow b - a = 7$$

$$\Rightarrow b = a + 7$$

Perpendicular distance between them = h = 17.5 cm

Area of the trapezium = 402.5 cm²

$$\Rightarrow \frac{1}{2} \times (\text{Sum of parallel sides}) \times \text{height} = 402.5$$

$$\Rightarrow \frac{1}{2} \times (a + b) \times h = 402.5$$

$$\Rightarrow \frac{1}{2} \times (a + a + 7) \times 17.5 = 402.5$$

$$\Rightarrow 2a + 7 = (402.5 \times 2) \div 17.5$$

$$\Rightarrow 2a + 7 = 46$$

$$\Rightarrow 2a = 46 - 7$$

$$\Rightarrow 2a = 39$$

$$\Rightarrow a = 39/2$$

$$\Rightarrow a = 19.5 \text{ cm}$$

Therefore, $b = a + 7 = 19.5 + 7 = 26.5 \text{ cm}$

Lengths of the parallel sides of the trapezium are 19.5 cm and 26.5 cm.

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