

Mensuration and Visualising Solid Shapes

Mathematics · Class 8 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Use of a calculator is **not** allowed.
- Take $\pi = \frac{22}{7}$ unless stated otherwise. Figures are not drawn to scale.

Section A — Mathematical Reasoning

Q1–Q8 · 1 mark each

1. The area of a trapezium whose parallel sides are a and b and whose height is h is _____.

(A) $\frac{1}{2}abh$

(B) $(a + b)h$

(C) $\frac{1}{2}(a + b)h$

(D) $a \times b \times h$

2. The volume of a cube of side 5 cm is _____.

(A) 25 cm^3

(B) 75 cm^3

(C) 150 cm^3

(D) 125 cm^3

3. The total surface area of a cube of side 4 cm is _____.

(A) 96 cm^2

(B) 64 cm^2

(C) 16 cm^2

(D) 24 cm^2

4. The volume of a cylinder of radius r and height h is _____.

(A) $2\pi rh$

(B) πrh^2

(C) πr^2h

(D) $2\pi r(r + h)$

5. 1 m^3 is equal to _____ litres.

(A) 100

(B) 1,00,000

(C) 10,000

(D) 1000

6. Euler's formula for a polyhedron with F faces, V vertices and E edges is _____.

(A) $F + V - E = 2$

(B) $F + V + E = 2$

(C) $F - V + E = 2$

(D) $F \times V = E$

7. How many faces does a triangular prism have?

(A) 4

(B) 5

(C) 6

(D) 9

8. The area of a rhombus whose diagonals are d_1 and d_2 is _____.

(A) $d_1 \times d_2$

(B) $\frac{1}{2} \times d_1 \times d_2$

(C) $2 \times d_1 \times d_2$

(D) $\frac{1}{4} \times d_1 \times d_2$

Section B — Everyday Mathematics and Reasoning

Q9–Q15 · 1 mark each

9. Find the area of the trapezium shown below.

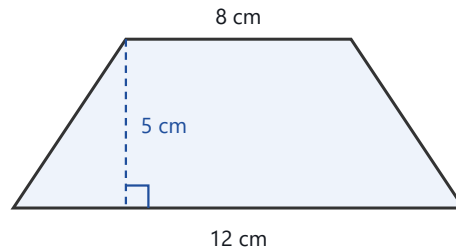


Fig. 9.1 — Trapezium with parallel sides 12 cm and 8 cm

(A) 40 cm^2

(B) 60 cm^2

(C) 50 cm^2

(D) 100 cm^2

10. A cuboidal box measures 10 cm by 8 cm by 6 cm. Its volume is _____.

(A) 144 cm^3

(B) 376 cm^3

(C) 240 cm^3

(D) 480 cm^3

11. A cylindrical drum has radius 7 cm and height 10 cm. Its volume is _____.

(A) 1540 cm^3

(B) 440 cm^3

(C) 2200 cm^3

(D) 154 cm^3

12. The diagonals of a rhombus-shaped field are 10 m and 24 m. Its area is _____.

(A) 240 m^2

(B) 120 m^2

(C) 60 m^2

(D) 34 m^2

13. The net shown below is folded up. Which solid does it form?

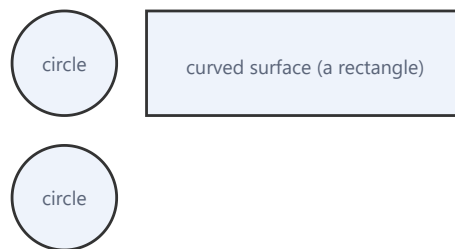


Fig. 13.1 — A net made of two circles and a rectangle

(A) Cone

(B) Sphere

(C) Cylinder

(D) Triangular prism

14. A polyhedron has 8 faces and 12 vertices. How many edges does it have?

(A) 16

(B) 18

(C) 20

(D) 24

15. A rectangular park measures 50 m by 30 m. Find the cost of levelling it at ₹8 per square metre.

(A) ₹1,280

(B) ₹15,000

(C) ₹12,800

(D) ₹12,000

Achievers Section

Q16–Q18 · 3 marks each

16. Consider the following statements.

(i) If the side of a cube is doubled, its volume becomes 8 times as large.

(ii) A cylinder is a polyhedron.

(iii) Two solids with the same volume must have the same surface area.

Which of the statements is/are correct?

(A) (i) only

(B) (i) and (ii) only

(C) (ii) and (iii) only

(D) All three

17. A cylindrical water tank has radius 1.4 m and height 5 m. How many litres of water can it hold?

(A) 30,800 litres

(B) 3,080 litres

(C) 3,08,000 litres

(D) 308 litres

18. The total surface area of a cube is 384 cm^2 . Find its volume.

(A) 256 cm^3

(B) 512 cm^3

(C) 576 cm^3

(D) 729 cm^3

Answer Key

1	C	2	D	3	A	4	C	5	D
6	A	7	B	8	B	9	C	10	D
11	A	12	B	13	C	14	B	15	D
16	A	17	A	18	B				

Solutions

1. **Answer: (C)** $\frac{1}{2}(a + b)h$

A trapezium is half of a parallelogram of base $(a + b)$ and height h , so its area is $\frac{1}{2}(a + b)h$ — half the sum of the parallel sides, times the distance between them.

2. **Answer: (D)** 125 cm^3

Volume of a cube = $\text{side}^3 = 5 \times 5 \times 5 = 125 \text{ cm}^3$.

3. **Answer: (A)** 96 cm^2

A cube has 6 equal square faces, each of area $4 \times 4 = 16 \text{ cm}^2$.

Total surface area = $6 \times 16 = 96 \text{ cm}^2$.

4. **Answer: (C)** $\pi r^2 h$

A cylinder is a circle of area πr^2 swept through a height h , so its volume is $\pi r^2 h$. The expression $2\pi r h$ is its curved surface area.

5. **Answer: (D)** 1000

$1 \text{ m}^3 = 100 \text{ cm} \times 100 \text{ cm} \times 100 \text{ cm} = 10,00,000 \text{ cm}^3$, and 1 litre = 1000 cm^3 .

So $1 \text{ m}^3 = 10,00,000 \div 1000 = 1000 \text{ litres}$.

6. **Answer: (A)** $F + V - E = 2$

Euler's formula states $F + V - E = 2$. For a cube, for example, $6 + 8 - 12 = 2$. ✓

7. **Answer: (B)** 5

A triangular prism has 2 triangular faces at the ends and 3 rectangular faces along its length, giving 5 faces in all. (It also has 9 edges and 6 vertices, and $5 + 6 - 9 = 2$. ✓)

8. **Answer: (B)** $\frac{1}{2} \times d_1 \times d_2$

The diagonals cut a rhombus into four right-angled triangles, and putting them together shows the area to be $\frac{1}{2} \times d_1 \times d_2$ — half the product of the diagonals.

9. **Answer: (C)** 50 cm^2

Area = $\frac{1}{2}(\text{sum of parallel sides}) \times \text{height}$

$$= \frac{1}{2} \times (12 + 8) \times 5$$

$$= \frac{1}{2} \times 20 \times 5 = 50 \text{ cm}^2.$$

10. **Answer: (D)** 480 cm^3

Volume of a cuboid = length $\times$ breadth $\times$ height

= $10 \times 8 \times 6 = 480 \text{ cm}^3$. (Its surface area would be $2(80 + 48 + 60) = 376 \text{ cm}^2$, which is offered as one of the distractors.)

11. **Answer: (A)** 1540 cm^3

$$\text{Volume} = \pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 10$$

$$= 22 \times 7 \times 10 = 1540 \text{ cm}^3.$$

12. **Answer: (B)** 120 m^2

$$\text{Area} = \frac{1}{2} \times d_1 \times d_2 = \frac{1}{2} \times 10 \times 24 = 120 \text{ m}^2.$$

13. Answer: (C) Cylinder

Rolling the rectangle into a tube gives the curved surface, and the two circles close off the two ends. The solid formed is a **cylinder**. A cone's net would be a circle and a sector, and a sphere has no net at all.

14. Answer: (B) 18

By Euler's formula, $F + V - E = 2$.

$$8 + 12 - E = 2$$

$$20 - E = 2, \text{ so } E = \mathbf{18}.$$

15. Answer: (D) ₹12,000

$$\text{Area} = 50 \times 30 = 1500 \text{ m}^2.$$

$$\text{Cost} = 1500 \times 8 = \mathbf{₹12,000}.$$

16. Answer: (A) (i) only

Statement (i) is true — volume = s^3 , so doubling s multiplies the volume by $2^3 = 8$. Statement (ii) is false; a polyhedron must be bounded entirely by flat polygonal faces, and a cylinder has a curved surface. Statement (iii) is false; a $1 \times 1 \times 8$ cuboid and a $2 \times 2 \times 2$ cube both have volume 8 but surface areas 34 and 24. Hence **(i) only**.

17. Answer: (A) 30,800 litres

$$\text{Volume} = \pi r^2 h = \frac{22}{7} \times 1.4 \times 1.4 \times 5.$$

$$\text{Now } \frac{22}{7} \times 1.4 = 4.4, \text{ so volume} = 4.4 \times 1.4 \times 5 = 30.8 \text{ m}^3.$$

$$\text{Since } 1 \text{ m}^3 = 1000 \text{ litres, capacity} = 30.8 \times 1000 = \mathbf{30,800 \text{ litres}}.$$

18. Answer: (B) 512 cm^3

Let the side be a . Then $6a^2 = 384$, so $a^2 = 64$ and $a = 8 \text{ cm}$.

$$\text{Volume} = a^3 = 8 \times 8 \times 8 = \mathbf{512 \text{ cm}^3}.$$