

GRADE 5 MATHEMATICS

AREA, PERIMETER & VOLUME

Complete Worksheet Pack

- Area of rectangles & squares
- Perimeter & missing sides
- Volume of cuboids & cubes
- Real-life applications
- Mixed problems & error analysis

6 practice worksheets + separate answer keys

- Challenge & reasoning

Worksheet 1 • Area of Rectangles & Squares

Calculate area and work backwards to find missing dimensions.

A. Find the area

1. Find the area of a rectangle 14 cm long and 8 cm wide.

2. Find the area of a square with side 11 m.

3. A garden is 25 m long and 12 m wide. Find its area.

4. A classroom floor is 9 m long and 7 m wide. Find its area.

5. A poster is 60 cm by 45 cm. Find its area.

B. Find the missing dimension

6. A rectangle has area 96 cm^2 and length 12 cm. Find its width.

7. A rectangle has area 180 m^2 and width 12 m. Find its length.

8. A square has area 144 cm^2 . Find the side length.

9. A rectangle has area 250 m^2 and length 25 m. Find its width.

C. Reasoning

10. Which has greater area: $18 \text{ m} \times 6 \text{ m}$ or $12 \text{ m} \times 10 \text{ m}$? Show your working.

11. Explain why area is measured in square units.

12. A student says the area of a $10 \text{ cm} \times 5 \text{ cm}$ rectangle is 30 cm^2 . Find the error.

Worksheet 1 • Area of Rectangles & Squares

Answer Key

A

1. 112 cm^2 2. 121 m^2 3. 300 m^2 4. 63 m^2 5. $2,700 \text{ cm}^2$

B

6. 8 cm 7. 15 m 8. 12 cm 9. 10 m

C

10. $18 \times 6 = 108 \text{ m}^2$; $12 \times 10 = 120 \text{ m}^2$, so 12×10 is greater. 11. Area measures how much surface a shape covers, so it uses square units. 12. $10 \times 5 = 50 \text{ cm}^2$, not 30 cm^2 .

Worksheet 2 • Perimeter & Missing Sides

Use perimeter formulas and reasoning to find unknown sides.

A. Calculate perimeter

1. Find the perimeter of a rectangle 15 cm by 9 cm.

2. Find the perimeter of a square with side 13 m.

3. A garden is 28 m by 17 m. Find its perimeter.

4. A rectangular playground is 45 m by 30 m. Find the perimeter.

B. Find the missing side

5. A rectangle has perimeter 54 cm and length 17 cm. Find its width.

6. A square has perimeter 64 m. Find its side length.

7. A rectangle has perimeter 80 cm and width 15 cm. Find its length.

8. A rectangle has perimeter 100 m and length 30 m. Find its width.

C. Compare & reason

9. A $20\text{ m} \times 10\text{ m}$ rectangle and a square with side 15 m have which greater perimeter?

10. Can two rectangles have the same perimeter but different areas? Give an example.

11. Why does doubling every side of a rectangle double its perimeter?

Worksheet 2 • Perimeter & Missing Sides

Answer Key

A

1. 48 cm 2. 52 m 3. 90 m 4. 150 m

B

5. 10 cm 6. 16 m 7. 25 cm 8. 20 m

C

9. Both are 60 m. 10. Yes; e.g. 4×6 and 3×7 . 11. Each of the four sides is doubled, so the total perimeter doubles.

Worksheet 3 • Volume of Cuboids & Cubes

Calculate volume and find missing dimensions.

A. Find the volume

1. Find the volume of a cuboid $8\text{ cm} \times 5\text{ cm} \times 3\text{ cm}$.

2. Find the volume of a box $12\text{ cm} \times 4\text{ cm} \times 5\text{ cm}$.

3. Find the volume of a cuboid $10\text{ m} \times 6\text{ m} \times 2\text{ m}$.

4. Find the volume of a cube with side 7 cm .

B. Missing dimensions

5. A cuboid has volume 120 cm^3 , length 10 cm and width 4 cm . Find its height.

6. A cuboid has volume 240 m^3 , length 10 m and width 6 m . Find its height.

7. A cube has volume 125 cm^3 . Find the side length.

C. Reasoning

8. Explain the difference between area and volume.

9. Why is volume measured in cubic units?

10. Which has greater volume: $10\text{ cm} \times 5\text{ cm} \times 4\text{ cm}$ or $8\text{ cm} \times 6\text{ cm} \times 5\text{ cm}$?

Worksheet 3 • Volume of Cuboids & Cubes

Answer Key

A

1. 120 cm^3 2. 240 cm^3 3. 120 m^3 4. 343 cm^3

B

5. 3 cm 6. 4 m 7. 5 cm

C

8. Area measures a surface; volume measures space inside a 3D object. 9. Three dimensions are multiplied, so units are cubic. 10. First = 200 cm^3 ; second = 240 cm^3 , so the second is greater.

Worksheet 4 • Area, Perimeter & Volume in Real Life

Apply formulas to practical situations.

A. Rooms & gardens

1. A rectangular room is 8 m by 6 m. Find its area and perimeter.

2. A garden is 20 m by 15 m. Find the area and the length of fencing needed around it.

3. A square patio has side 9 m. Find its area and perimeter.

B. Boxes & containers

4. A storage box measures 30 cm $\times$ 20 cm $\times$ 15 cm. Find its volume.

5. A fish tank measures 80 cm $\times$ 40 cm $\times$ 50 cm. Find its volume in cm^3 .

6. A cube-shaped gift box has side 12 cm. Find its volume.

C. Multi-step problems

7. A rectangular playground is 30 m by 18 m. A 2 m-wide path runs around the outside. What are the outside dimensions and outside perimeter?

8. A classroom floor is 10 m by 8 m. Each square metre needs 4 tiles. How many tiles are needed?

9. A box has a volume of $1,200 \text{ cm}^3$. Its length is 15 cm and width is 8 cm. Find its height.

Worksheet 4 • Area, Perimeter & Volume in Real Life

Answer Key

A

1. Area 48 m^2 ; perimeter 28 m. 2. Area 300 m^2 ; fencing 70 m. 3. Area 81 m^2 ; perimeter 36 m.

B

4. $9,000 \text{ cm}^3$. 5. $160,000 \text{ cm}^3$. 6. $1,728 \text{ cm}^3$.

C

7. Outside dimensions $34 \text{ m} \times 22 \text{ m}$; outside perimeter 112 m. 8. 320 tiles. 9. 10 cm.

Worksheet 5 • Mixed Problems & Error Analysis

Choose the correct formula and check whether answers are sensible.

A. Mixed practice

1. Find the area and perimeter of a rectangle 24 cm by 10 cm.

2. Find the area and perimeter of a square with side 16 m.

3. Find the volume of a cuboid $15\text{ cm} \times 8\text{ cm} \times 4\text{ cm}$.

4. A rectangle has area 315 m^2 and width 15 m. Find its length and perimeter.

B. Find the mistake

5. Sam says the perimeter of a $12\text{ cm} \times 5\text{ cm}$ rectangle is 60 cm. Correct him.

6. Mia says the area of a square with side 9 m is 36 m^2 . Correct her.

7. A student calculates the volume of $10\text{ cm} \times 4\text{ cm} \times 3\text{ cm}$ as 17 cm^3 . Explain the error.

C. Reasoning

8. A rectangle has area 72 cm^2 . Give two possible whole-number pairs for its length and width.

9. A square and rectangle have the same area. Must they have the same perimeter? Explain.

10. A cuboid's length is doubled while width and height stay the same. What happens to its volume?

Worksheet 5 • Mixed Problems & Error Analysis

Answer Key

A

1. Area 240 cm^2 ; perimeter 68 cm. 2. Area 256 m^2 ; perimeter 64 m. 3. 480 cm^3 . 4. Length 21 m; perimeter 72 m.

B

5. Perimeter = $2(12+5)=34$ cm. 6. Area = $9 \times 9 = 81 \text{ m}^2$. 7. Volume = $10 \times 4 \times 3 = 120 \text{ cm}^3$; the student added or otherwise combined dimensions incorrectly.

C

8. Examples: 8×9 and 6×12 . 9. No; shapes can have equal area but different perimeters. 10. The volume doubles.

Worksheet 6 • Area, Perimeter & Volume Challenge

Use several steps and compare different shapes.

A. Challenge

1. A rectangle has area 240 cm^2 and length 20 cm . Find its width and perimeter.

2. A square and a rectangle both have perimeter 40 cm . The square has side 10 cm . If the rectangle has length 14 cm , find its width and area.

3. A cuboid has volume 720 cm^3 . Its dimensions are 12 cm , 10 cm and h . Find h .

4. A cube has the same volume as a cuboid measuring $8 \text{ cm} \times 6 \text{ cm} \times 6 \text{ cm}$. Find the cube's volume and estimate its side length.

B. Compare & reason

5. Rectangle A is $18 \text{ m} \times 8 \text{ m}$. Rectangle B is $20 \text{ m} \times 7 \text{ m}$. Compare their areas and perimeters.

6. A square has area 196 cm^2 . Find its side and perimeter.

7. A box measures $25 \text{ cm} \times 16 \text{ cm} \times 10 \text{ cm}$. How many $1,000 \text{ cm}^3$ blocks could fit by volume alone?

C. Think like a mathematician

8. Give two different rectangles with area 60 cm^2 and compare their perimeters.

9. Explain why increasing all three dimensions of a cuboid changes volume more dramatically than perimeter.

10. Create your own area, perimeter or volume problem with an answer of 144 and solve it.

Worksheet 6 • Area, Perimeter & Volume Challenge

Answer Key

A

1. Width 12 cm; perimeter 64 cm. 2. Width 6 cm; area 84 cm². 3. h=6 cm; 4. Volume 288 cm³; cube side is about 6.6 cm because 6³=216 and 7³=343.

B

5. A area 144 m², perimeter 52 m; B area 140 m², perimeter 54 m. A has greater area; B has greater perimeter. 6. Side 14 cm; perimeter 56 cm. 7. 4 blocks by volume alone.

C

8. Examples: 5×12 has perimeter 34 cm; 6×10 has perimeter 32 cm. 9. Volume multiplies three dimensions, while perimeter adds lengths around a boundary. 10. Answers vary; check the formula and units.