

Scale It Up

Read a plan, find actual sizes, and draw a new scale.

GRADE 7 • 7.PAR.4.6

7.PAR.4.6 "Solve everyday problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale."

NAME _____

DATE _____

CONNECT THE REPRESENTATIONS

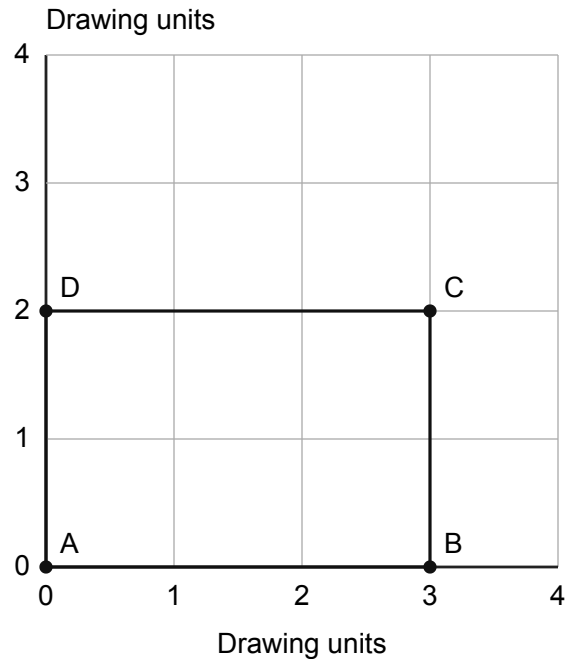
Each grid interval is 1 drawing unit. A scale connects drawing units to real lengths. Multiply by the scale to find actual lengths; for a rectangle, multiply actual length by actual width to find area. To redraw, divide actual lengths by the new scale.

Worked example

A rectangular garden uses a scale of 1 drawing unit = 5 m. Read its plan and find its actual dimensions and area.

The drawing is 3 units wide and 2 units high.
Actual dimensions: $3(5) = 15$ m and $2(5) = 10$ m.
Area: $15(10) = 150$ square meters.

15 m by 10 m; 150 square meters.



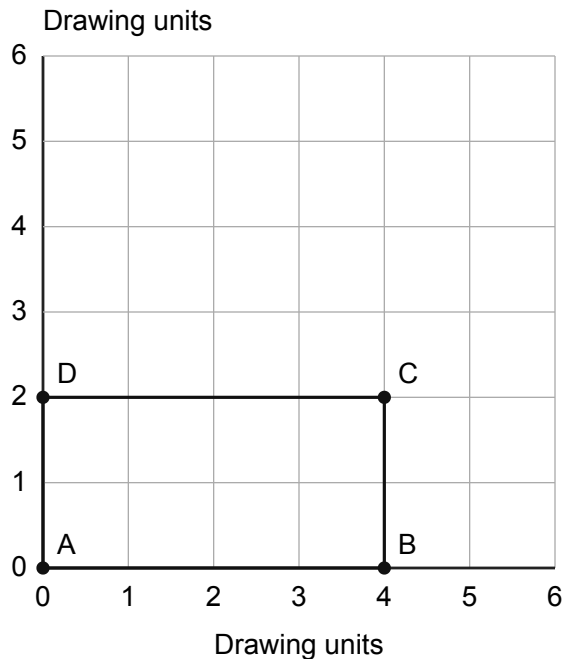
Use the numbered grid intervals as drawing units; each square side is 1 unit. Show calculations. Draw the new plans in tasks 5 and 6; add actual-length labels in task 5.

1. Practice

On a trail map, 1 cm represents 6 m. A measured trail is 8 cm long on the map. Find its actual length.

2. Practice

This rectangular patio plan uses 1 drawing unit = 3 m. Find its actual dimensions and area.

**3. Practice**

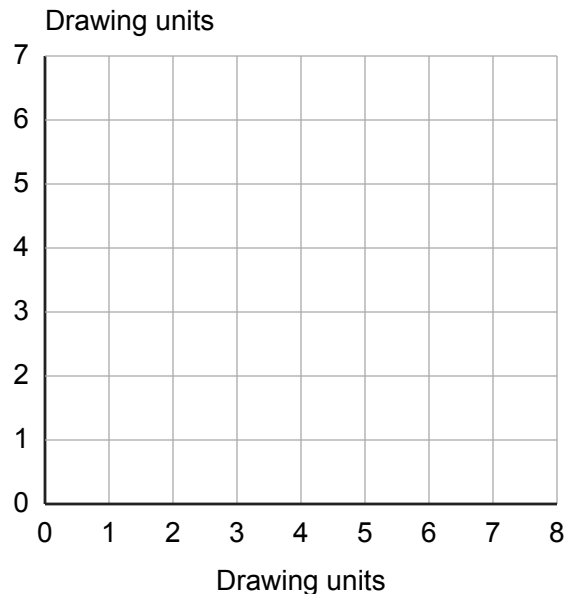
A real garden is 24 m by 16 m. At 1 drawing unit = 4 m, what dimensions must its plan have?

4. Practice

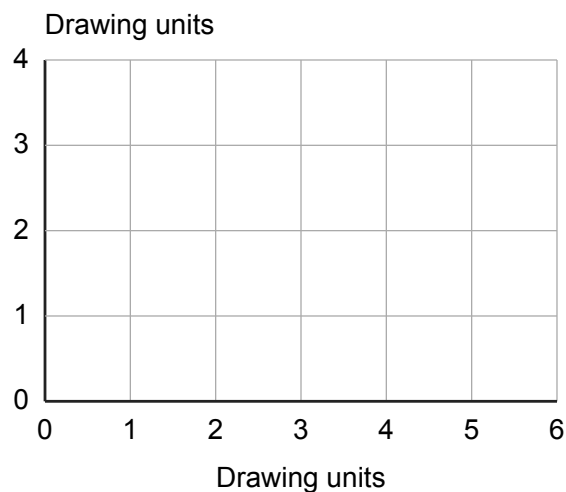
A plan has an area of 12 square drawing units. Its scale is 1 drawing unit = 2 m. Find the actual area and explain why multiplying by 2 alone is wrong.

5. Apply

A rectangular play area is drawn 2 units wide and 3 units high at 1 unit = 4 m. Redraw it on this grid at 1 unit = 2 m, with its lower-left corner at (0, 0). Label actual side lengths.

**6. Apply**

A stage plan is 6 units wide and 4 units high at 1 unit = 2 m. Redraw it at 1 unit = 4 m from (0, 0). State the actual area and explain why it stays the same.

**7. Challenge**

A plan uses 1 unit = 3 m. A designer redraws it at 1 unit = 1.5 m. How do drawing lengths and drawing area change? Does actual area change? Explain.

Grid intervals are drawing units, not printed centimeters. Task 5 requires an 8 m by 12 m label; task 6 requires the unchanged actual area.

Task 1

48 m; $8(6) = 48$.

Task 2

12 m by 6 m; 72 square meters.

Task 3

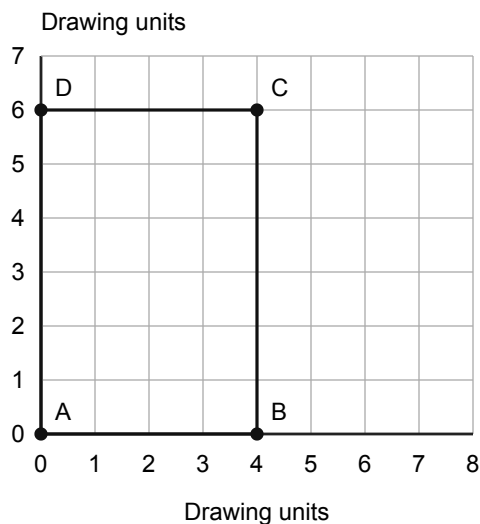
6 drawing units by 4 drawing units; $24/4 = 6$ and $16/4 = 4$.

Task 4

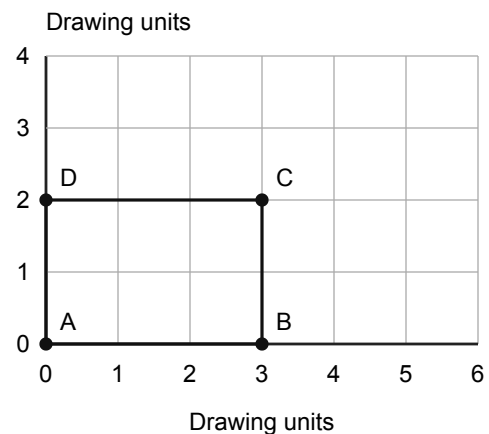
48 square meters. Each unit square represents 2 m by 2 m, or 4 square meters.

Task 5

A 4-unit-wide by 6-unit-high rectangle, labeled 8 m by 12 m. Original actual size: $2(4)$ by $3(4) = 8$ m by 12 m. Divide by 2 to get new drawing dimensions 4 by 6.

**Task 6**

A 3-unit-wide by 2-unit-high rectangle. Actual area remains $12(8) = 96$ square meters; only the drawing scale changes. The actual stage is 12 m by 8 m. Divide each length by 4; the real stage is unchanged.

**Task 7**

Drawing lengths double and drawing area becomes four times as large. Actual area is unchanged because both plans represent the same object.