GRADE 7 ACCELERATED · UNIT 5 · LESSON 4

Real-World Scale Drawings

MA.7.GR.1.5

I can use a scale such as ¼ in : 1 ft to find real lengths and areas from a drawing, and drawing lengths from real ones.

Warm-Up

1. A figure of area $9\,\text{cm}^2$ is scaled by $k = 2$. The copy's area?
2. A 5 cm side becomes 3 cm in the copy. Find the scale factor.
3. Find the product: 1.5×2.4
4. A car goes 90 miles in 2 hours. How far does it go per hour?

Warm-Up

1. A figure of area $9\,\text{cm}^2$ is scaled by $k = 2$. The copy's area?

   36 cm²

2. A 5 cm side becomes 3 cm in the copy. Find the scale factor.

   k = 0.6

3. Find the product: 1.5×2.4 **3.6**

4. A car goes 90 miles in 2 hours. How far does it go per hour?

   45 miles per hour

Vocabulary

floor plan

a scale drawing of a room or building seen from above

scale (two units)

a ratio such as $\frac{1}{4}\text{ in} : 1\text{ ft}$ — a drawing length and the real length it stands for

unit rate of a scale

the scale written per 1 drawing unit: $\frac{1}{4}\text{ in} : 1\text{ ft}$ is $1\text{ in} : 4\text{ ft}$

scale with one unit

$1 : 50$ — no units: 1 cm of model is 50 cm of car. $1\text{ in} : 4\text{ ft}$ is $1 : 48$ this way,

and 48 is the scale factor

Notes

I. A scale is a rate: write it per 1 unit

$$\frac{1}{4}\ \text{in} : 1\ \text{ft} \quad \rightarrow \quad 1\ \text{in} : 4\ \text{ft}$$

Drawing × rate = real. Real ÷ rate = drawing. With one unit, 1 in : 4 ft is 1 : 48.

Notes

II. Area: go to the real dimensions first

1 in : 4 ft



$$8 \text{ ft} \times 10 \text{ ft} = 80 \text{ ft}^2$$

Notes

III. Real to drawing is a division

$$14 \div 4 = 3.5 \text{ in}$$

No scale printed? One pair gives it: 2 in ↔ 9 ft is 4.5 ft per inch.

Example 1

A floor plan is drawn at $\frac{1}{4}$ in : 1 ft.

A room is 2.5 in by 3 in on the plan.

Find the room's real dimensions and area.

Example 1

$\frac{1}{4}$ in : 1 ft = 1 in : 4 ft

$2.5 \times 4 = 10$ $\quad$ $3 \times 4 = 12$

$10 \times 12 = 120$

Answer: 10 ft by 12 ft; 120 ft²

Your Turn

A floor plan is drawn at $\frac{1}{4}$ in : 1 ft.

A room is 1.5 in by 4 in on the plan.

Find the room's real dimensions and area.

Your Turn

A floor plan is drawn at $\frac{1}{4}$ in : 1 ft.

A room is 1.5 in by 4 in on the plan.

Find the room's real dimensions and area.

$1.5 \times 4 = 6$ $\quad$ $4 \times 4 = 16$

$6 \times 16 = 96$

Answer: 6 ft by 16 ft; 96 ft²

Example 2

On a drawing a wall is 4 in long; the real wall is 18 ft. Another wall is 6 in long on the drawing.

How long is the second wall really?

Example 2

$18 \div 4 = 4.5$ ft per in

$6 \times 4.5 = 27$

Answer: 27 ft

Your Turn

On a drawing a wall is 2 in long; the real wall is 13 ft. Another wall is 5 in long on the drawing.

How long is the second wall really?

Your Turn

On a drawing a wall is 2 in long; the real wall is 13 ft. Another wall is 5 in long on the drawing.

How long is the second wall really?

$$13 \div 2 = 6.5 \text{ ft per in}$$

$$5 \times 6.5 = 32.5$$

Answer: 32.5 ft

Whiteboards · Question 1 of 9

A plan is drawn at $\frac{1}{2}$ in : 1 ft.

A wall is 4 in long on it.

How long is the real wall?

Answer it.

Whiteboards · Question 1 of 9

A plan is drawn at $\frac{1}{2}$ in : 1 ft.

A wall is 4 in long on it.

How long is the real wall?

$$\frac{1}{2} \text{ in} : 1 \text{ ft} = 1 \text{ in} : 2 \text{ ft}$$

$$4 \times 2 = 8$$

Answer: 8 ft

Whiteboards · Question 2 of 9

A plan is drawn at $1\text{ in} : 3\text{ ft}$.

A room is 2.5 in long on it.

How long is the real room?

Answer it.

Whiteboards · Question 2 of 9

A plan is drawn at $1\text{ in} : 3\text{ ft}$.

A room is 2.5 in long on it.

How long is the real room?

$$2.5 \times 3 = 7.5$$

Answer: 7.5 ft

Whiteboards · Question 3 of 9

A plan is drawn at $1\text{ in} : 3\text{ ft}$.

A real wall is 21 ft long.

How long is it on the plan?

Answer it.

Whiteboards · Question 3 of 9

A plan is drawn at $1\text{ in} : 3\text{ ft}$.

A real wall is 21 ft long.

How long is it on the plan?

$$21 \div 3 = 7$$

Answer: 7 in

Whiteboards · Question 4 of 9

A model car is built at $1:50$ and is 8 cm long.

How long is the real car?

A. 4 m

B. 0.16 m

C. 400 m

D. 58 cm

Answer it.

Whiteboards · Question 4 of 9

A model car is built at $1:50$ and is 8 cm long.

How long is the real car?

$$8 \times 50 = 400 \text{ cm}$$

$$400 \div 100 = 4 \text{ m}$$

Answer: A — 4 m

Whiteboards · Question 5 of 9

A plan is drawn at $\frac{1}{4}$ in : 1 ft.

A real wall is 15 ft long.

How long is it on the plan?

Answer it.

Whiteboards · Question 5 of 9

A plan is drawn at $\frac{1}{4}$ in : 1 ft.

A real wall is 15 ft long.

How long is it on the plan?

$1 \text{ in} : 4 \text{ ft} \qquad 15 \div 4 = 3.75$

Answer: 3.75 in

Whiteboards · Question 6 of 9

A plan is drawn at $1\text{ in} : 4\text{ ft}$.

A room is 2 in by 3 in on it.

What is the room's real area?

A. 24 ft^2

B. 96 ft^2

C. 40 ft^2

D. 20 ft^2

Answer it.

Whiteboards · Question 6 of 9

A plan is drawn at $1\text{ in} : 4\text{ ft}$.

A room is 2 in by 3 in on it.

What is the room's real area?

$$2 \times 4 = 8 \qquad 3 \times 4 = 12$$

$$8 \times 12 = 96$$

Answer: B — 96 ft²

Whiteboards · Question 7 of 9

A plane is 36 ft long.

One model of it is built at $1:48$, another at $1:72$.

Which model is longer, and by how much?

Answer it.

Whiteboards · Question 7 of 9

A plane is 36 ft long.

One model of it is built at $1:48$, another at $1:72$.

Which model is longer, and by how much?

$$36 \times 12 = 432 \text{ in}$$

$$432 \div 48 = 9 \qquad 432 \div 72 = 6$$

Answer: The 1 : 48 model, by 3 in (9 in against 6 in)

Whiteboards · Question 8 of 9

Mia, who is 13, enlarges her 9 in by 12 in poster into a mural.

The mural's scale is $1\text{ in} : 2\text{ ft}$.

What are the mural's dimensions?

Answer it.

Whiteboards · Question 8 of 9

Mia, who is 13, enlarges her 9 in by 12 in poster into a mural.

The mural's scale is $1\text{ in} : 2\text{ ft}$.

What are the mural's dimensions?

$$9 \times 2 = 18 \qquad 12 \times 2 = 24$$

Answer: 18 ft by 24 ft

Whiteboards · Question 9 of 9

On Andrew's drawing a wall is 3.5 in wide and 4 in tall; the real wall is 26.25 ft wide.

Find the real height and the real area. Which step uses the scale?

Write your answer in sentences.

Whiteboards · Question 9 of 9

On Andrew's drawing a wall is 3.5 in wide and 4 in tall; the real wall is 26.25 ft wide.

Find the real height and the real area. Which step uses the scale?

$26.25 \div 3.5 = 7.5$ ft per in $\qquad 4 \times 7.5 = 30$

$26.25 \times 30 = 787.5$

Answer: 30 ft high; 787.5 ft². The scale (7.5 ft per in) is the step from 4 in to 30 ft.

Independent Set

1. A plan is drawn at $\frac{1}{2}\text{ in} : 1\text{ ft}$. A wall is 6 in long on it. Find the real length.
2. A plan is drawn at $1\text{ in} : 5\text{ ft}$. A room is 3.2 in long on it. Find the real length.
3. A plan is drawn at $1\text{ in} : 5\text{ ft}$. A real wall is 22 ft long. Find its length on the plan.
4. A plan is drawn at $\frac{1}{4}\text{ in} : 1\text{ ft}$. A room is 2 in by 3.5 in on it. Find the real dimensions and area.
5. A model boat is built at $1 : 40$ and is 15 cm long. Find the real boat's length in meters.
6. On a drawing a wall is 3 in long; the real wall is 16.5 ft. Another wall is 5 in long on the drawing. How long is it really?

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 67. Due by the Unit 5 test.

Today's skills — all required

Scale drawings: word problems — 84H
Scale drawings: scale factor word problems — KCM