

Scale Drawings: Lengths, Areas and Scale Factors

Grade 7 math · Worksheet Answer Key · Standards: 7.G.A.1

Each answer shows the conversion with the scale, any unit change, and the final result in bold. When your area differs, check whether the scale was squared once, not twice, and whether lengths were converted before multiplying.

Standards: 7.G.A.1 · **Level:** Grade 7

Problem 1 Fence Plan Length

$$3 \times 5 = 15.$$

15 feet

Problem 2 Highway on a Map

$$2.5 \times 30 = 75.$$

75 miles

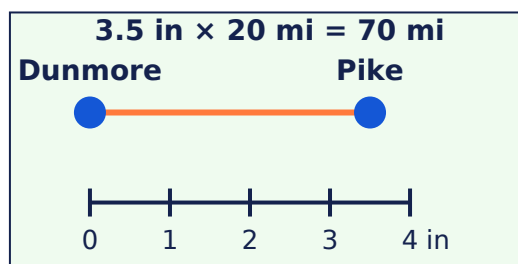
Problem 3 Drawing a Length

$$40 \div 8 = 5.$$

5 inches

Problem 4 Measure Between Two Towns

$$3.5 \times 20 = 70.$$



Each inch stands for 20 miles.

70 miles

Problem 5 Find the Scale

$9 \text{ ft} \div 6 = 1.5 \text{ ft per inch}$, so the scale is $1 \text{ in} = 1.5 \text{ ft}$.

Scale factor: $1.5 \text{ ft} = 18 \text{ in}$, so the factor is $1 \div 18$. Check: $6 \text{ in} \div 108 \text{ in} = \frac{1}{18}$.

1 in = 1.5 ft; scale factor $\frac{1}{18}$

Problem 6 Blueprint Living Room

Each 0.25 in is 1 ft, so $6.75 \div 0.25 = 27$.

27 feet

Problem 7 Blueprint Kitchen

$14 \times 0.25 = 3.5$ and $11 \times 0.25 = 2.75$.

3.5 in by 2.75 in

Problem 8 Trail in Feet

$3.75 \times 2 = 7.5$ miles. Then $7.5 \times 5,280 = 39,600$.

39,600 feet

Problem 9 Scale Table

Multiply each drawing length by 12: $1 \times 12 = 12$, $2.5 \times 12 = 30$, $4 \times 12 = 48$, $6.25 \times 12 = 75$.

Drawing (in)	1	2.5	4	6.25
Actual (ft)	12	30	48	75

Completed table.

12, 30, 48, 75 feet

Problem 10 Same Wall, Two Drawings

Actual wall: $5 \times 4 = 20 \text{ ft}$. On Drawing B: $20 \div 10 = 2$.

2 inches

Problem 11 Area from a Rectangle Drawing

Actual dimensions: $4 \times 6 = 24$ ft and $3 \times 6 = 18$ ft. Area: $24 \times 18 = 432$.

Check by area factor: $12 \text{ sq in} \times 6^2 = 12 \times 36 = 432$.

432 square feet

Problem 12 Garden on Paper

Drawing dimensions: $30 \div 6 = 5$ in and $18 \div 6 = 3$ in. Area: $5 \times 3 = 15$.

15 square inches

Problem 13 A Ratio Scale

$15 \text{ ft} = 15 \times 12 = 180$ in. Model: $180 \div 24 = 7.5$.

7.5 inches

Problem 14 Redraw at a New Scale

Actual: $8 \times 3 = 24$ ft by $5 \times 3 = 15$ ft. New drawing: $24 \div 6 = 4$ in and $15 \div 6 = 2.5$ in.

Areas: 40 sq in and 10 sq in, and $10 \div 40 = \frac{1}{4}$, which equals $(\frac{1}{2})^2$.

4 in by 2.5 in; the new area is $\frac{1}{4}$ of the old area

Problem 15 Classroom Carpet

Actual: $7.5 \times 4 = 30$ ft and $6 \times 4 = 24$ ft. Area: $30 \times 24 = 720$ sq ft. Cost: $720 \times 2.80 = 2,016$.

\$2,016

Problem 16 Road Trip Timing

Distance: $4.2 \times 45 = 189$ mi. Time: $189 \div 60 = 3.15$ hours, which is 3 hours and $0.15 \times 60 = 9$ minutes.

3 hours 9 minutes

Problem 17 Playground Fence

Actual: $5.5 \times 8 = 44$ ft and $3 \times 8 = 24$ ft. Perimeter: $2(44 + 24) = 136$ ft. Cost: $136 \times 9.50 = 1,292$.

\$1,292

Problem 18 Enlarging a Photo

New size: $4 \times 2.5 = 10$ in and $6 \times 2.5 = 15$ in. Areas: 24 sq in and 150 sq in. Ratio: $150 \div 24 = 6.25 = 2.5^2$.

10 in by 15 in; the area is 6.25 times as large

Problem 19 Mural Sketches

Small sketch: $9 \div 1.5 = 6$ in and $6 \div 1.5 = 4$ in, area 24 sq in. Large sketch: $9 \div 0.75 = 12$ in and $6 \div 0.75 = 8$ in, area 96 sq in.

$96 \div 24 = 4$, and the length factor is $12 \div 6 = 2$, with $2^2 = 4$.

4 times the area

Problem 20 Lake on Two Maps

Actual: $2.5 \times 20 = 50$ mi and $1.5 \times 20 = 30$ mi, so $50 \times 30 = 1,500$ sq mi.

On Map B: $50 \div 50 = 1$ in and $30 \div 50 = 0.6$ in, so the area is 0.6 sq in. Check: $1,500 \div 50^2 = 1,500 \div 2,500 = 0.6$.

1,500 square miles; 0.6 square inch on Map B