

Scale Drawings and Similar Figures: practice solutions, Grade 7 – download the PDF

Written solutions to the chapter problems. Check each step, then correct yourself.

1 Drawing to real length



Each centimeter stands for 4 m, so the actual length is $6 \times 4 = 24$ m.

The wall is 24 m long.

2 Find the scale factor



$\frac{12}{4} = 3$ and $\frac{18}{6} = 3$. The two ratios agree.

The scale factor is 3.

3 A road map



$3.5 \times 10 = 35$.

The cities are 35 mi apart.

4 True or false: angles



No. In a scale drawing the lengths change but the angles stay the same. A 40° angle is still 40° after the enlargement.

Mia is wrong.

5 Real to drawing



$$50 \div 5 = 10.$$

The field is 10 cm wide in the drawing.

6 A model car



The real car is $7 \times 24 = 168$ in long. Then $168 \div 12 = 14$ ft.

The real car is 14 ft long.

7 Complete the table



Multiply by 3 to go from the drawing to the actual length: $2 \times 3 = 6$ and $5 \times 3 = 15$.

Divide by 3 for the last row: $45 \div 3 = 15$.

Drawing length	Actual length
2 cm	6 ft
5 cm	15 ft
15 cm	45 ft

8 A bedroom floor plan



a. $2.5 \times 4 = 10$ ft and $3 \times 4 = 12$ ft.

b. $10 \times 12 = 120$. The bedroom is 10 ft by 12 ft, with an area of 120 square feet.

9 Similar triangles



Scale factor: $\frac{9}{6} = 1.5$. Check with the second pair: $\frac{12}{8} = 1.5$.

$x = 10 \times 1.5 = 15$. The third side is 15.

10 Kilometers on a map



The actual length is $7.2 \times 500 = 3600$ m. Since $1000 \text{ m} = 1 \text{ km}$, $3600 \div 1000 = 3.6$ km.

The trail is 3.6 km long.

11 Fractional scale



Each $\frac{1}{4}$ in = 0.25 in stands for 1 ft. The number of quarter inches in 3.5 in is $3.5 \div 0.25 = 14$.

The porch is 14 ft long.

12 Changing the scale



The actual size is $8 \times 2 = 16$ m by $5 \times 2 = 10$ m.

New drawing: $16 \div 4 = 4$ cm and $10 \div 4 = 2.5$ cm.

The new drawing is 4 cm by 2.5 cm. (Shortcut: the factor is $\frac{2}{4} = \frac{1}{2}$.)

13 Is it a scale drawing?



$\frac{6}{4} = 1.5$ but $\frac{8}{6} \approx 1.33$. The ratios are not equal.

No, it is not a scale drawing, because the sides are not proportional.

14 A model of a tower



150 m = 15,000 cm. Then $15,000 \div 200 = 75$.

The model is 75 cm tall.

15 Area of an enlargement



a. Original: $3 \times 5 = 15$ cm². The enlargement is 12 cm by 20 cm, so its area is

$$12 \times 20 = 240 \text{ cm}^2.$$

b. $240 \div 15 = 16 = 4^2$. The area was multiplied by 16.

16 Area of a lake



Map area: $2.4 \times 1.5 = 3.6$ cm². Each cm² stands for $5^2 = 25$ km².

$3.6 \times 25 = 90$. The lake covers 90 km².

Check: the actual sides are 12 km and 7.5 km and $12 \times 7.5 = 90$.

17 A garden plan



Each cm² stands for $50^2 = 2500$ cm². The actual area is $48 \times 2500 = 120,000$ cm².

Since $1 \text{ m}^2 = 10,000 \text{ cm}^2$, $120,000 \div 10,000 = 12$. The garden has an area of 12 m².

18 Find the scale factor from areas



The area ratio is $\frac{81}{36} = \frac{9}{4}$. Since area ratio = k^2 , $k = \sqrt{\frac{9}{4}} = \frac{3}{2} = 1.5$.

Copy: $9 \times 1.5 = 13.5$ in by $4 \times 1.5 = 6$ in. Check: $13.5 \times 6 = 81$.

The scale factor is 1.5 and the copy is 13.5 in by 6 in.

19 Photo enlargement



a. $\frac{10}{4} = 2.5$.

b. $6 \times 2.5 = 15$ in.

c. The area goes from $4 \times 6 = 24$ in² to $10 \times 15 = 150$ in², and $150 \div 24 = 6.25 = 2.5^2$. The area is 6.25 times larger.

20 Floor of a model house



a. $24 \times 50 = 1200$ cm = 12 m and $18 \times 50 = 900$ cm = 9 m.

b. $12 \times 9 = 108$. The actual floor area is 108 m².

Check: the model area is $24 \times 18 = 432$ cm², and $432 \times 2500 = 1,080,000$ cm² = 108 m².

21 Perimeter and area of similar triangles



a. $6 \times 2.5 = 15$, $8 \times 2.5 = 20$, $10 \times 2.5 = 25$.

b. ABC: $6 + 8 + 10 = 24$. DEF: $15 + 20 + 25 = 60$. $60 \div 24 = 2.5$: the perimeter is multiplied by 2.5.

c. ABC: $\frac{6 \times 8}{2} = 24$. DEF: $\frac{15 \times 20}{2} = 150$. $150 \div 24 = 6.25 = 2.5^2$: the area is multiplied by 6.25.

22

Which scale is bigger?

Map X: $10 \div 2 = 5$ cm. Map Y: $10 \div 5 = 2$ cm.

The scale factor from Y to X is $\frac{5}{2} = 2.5$. Map X shows the park 2.5 times longer (and its area 6.25 times larger).

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