Answers

Get Ready, pages 174–175

1.

	Ratio Notation	Equivalent Fraction in Lowest Terms	Decimal	Percent
a) ○○○○ ●●	2 : 6	$\frac{2}{6} \overset{\div 2}{=} \frac{1}{3}$	$0.\overline{3}$	$33.\overline{3}\,\%$
b) ○○○○○○ ●●●●	4 : 10	$\frac{4}{10} \overset{\div 2}{=} \frac{2}{5}$	0.4	40 %

2. a) 10 **b)** 1

3. a) $\frac{28}{2800}$ **b)** $\frac{1}{30} = \frac{6}{180}$

4. $\frac{4}{12} = \frac{0.4}{1.2}$; 1.2 m

Math Link

1. a) 840 000 cm^2 Answers may vary due to measuring. Example:
b) 36.52 cm^2 **c)** 23001.1

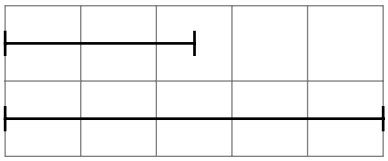
2. a) 150 000 cm^2 Answers may vary due to measuring. Example:
b) 6.3 cm^2 **c)** 23809.5

3. Answers will vary. Example: The ratios are approximately the same.

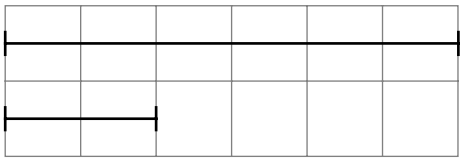
4.1 Warm Up, page 177

1. a) length: 4 cm; width: 3 cm **b)** length of base: 5 cm; height: 1 cm

2. a)



b)



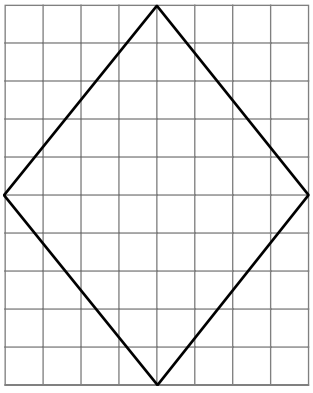
3. a) 12 **b)** 1 **c)** 1 **d)** 7.2

4. a) 10.2 **b)** 24 **c)** 24 **d)** 18

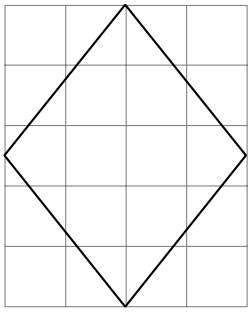
4.1 Enlargements and Reductions, pages 178–187

Working Example 1: Show You Know

1-cm grid paper:

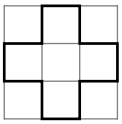


2-cm grid paper:



Working Example 2: Show You Know

0.5-cm grid paper:



Communicate the Ideas

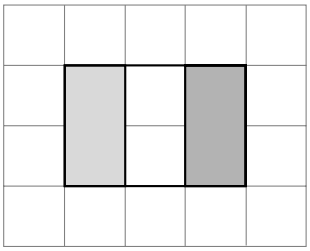
1. YES. Answers may vary. Example: The objects in the book are smaller than they would be in real life.

2. NO. Mary only enlarged the 3-cm side of the rectangle. The enlargement for the 5-cm side length should be 15 cm.

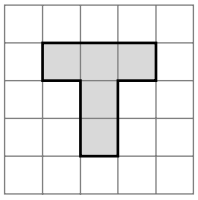
3. a) The photo will be reduced to half the size. **b)** The photo will be enlarged to 8 times the size. **c)** Use scale factor of 1 to keep the photo the same size.

Practise

4. length = 6 cm, width = 4 cm
2-cm grid paper:

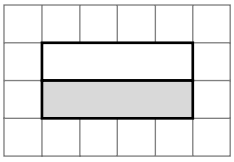


5. measurements of sides = 1.5 cm; 0.5 cm; 1 cm; 0.5 cm
05-cm grid paper:



6. a) greater than 1 **b)** equal to 1 **c)** less than 1

7. length = 2 cm, width = 1 cm
05-cm grid paper:

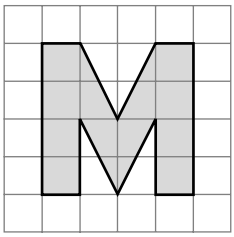


Apply

8. a) reduction **b)** Answers may vary. Example: 0.1

9. a) The flag is 4 cm wide. **b)** The new dimensions are 12 cm by 24 cm.
c) The new dimensions are 2 cm by 1 cm.

10. 1-cm grid paper:



Math Link

Answers will vary.

4.2 Warm Up, page 188

1. a) 30 **b)** 800 **c)** 3 **d)** 6

2. a) $\frac{1}{15}$ **b)** $\frac{1}{1000}$

3. a) 24.9 **b)** 159.2

4. a) 1124.83 **b)** 58.25

5. a) 3000 **b)** 3 **c)** 14 000 **d)** 40

4.2 Scale Diagrams, pages 189–195

Working Example 1: Show You Know

46 cm

Working Example 2: Show You Know

a) 180 **b)** $\frac{1}{18\,000\,000}$

Communicate the Ideas

1. a) 15 **b)** 1 : 15 000 000

2. Answers will vary. Example: Measure the length of the planes in both photos and determine the scale factor. Measure the wingspan of both photos and determine the scale factor. If the scale factor is the equal, the planes are proportional.

Practise

3. a) 12 **b)** 4 **c)** 10 **d)** 12 **e)** 200 **f)** 100

4. a) 2 **b)** 0.15 **c)** 0.02 **d)** 0.5

5. a) 1500 cm **b)** 16 mm

6. $\frac{1}{16\,000\,000}$

Apply

7. a) $\frac{1}{15}$ **b)** 3.2 cm **c)** The length of the bear's foot is 48 cm.

8. The length of the eagle's wingspan is 200 cm or 2 m.

9. a) 2 **b)** 3 **c)** 0.5 or $\frac{1}{2}$ **d)** $0.\overline{3}$ or $\frac{1}{3}$

10. Her volcano will be 25 m tall. It will not fit into the classroom.

Math Link

Answers will vary.

4.3 Warm Up, page 196

1. a) 50° **b)** 20°

2. 63°

3. a) 8 **b)** 312

4. a) 30 **b)** 4

5. a) 54 **b)** 5

4.3 Similar Triangles, pages 197–207

Working Example 1: Show You Know

a) The corresponding angles are equal. The scale factor is 0.5. YES. The corresponding angles are equal and the corresponding sides are proportional. **b)** NO. The corresponding sides are not proportional.

Working Example 2: Show You Know

a) The scale factor is 4; The missing side length is 2.5. **b)** 2.5

Communicate the Ideas

1. Answers may vary. Examples: **a)** The corresponding angles are equal. **b)** The corresponding sides are proportional in length.

2. NO. Answers may vary. Example: Side XY and LM are not proportional in length.

Practise

3. a) $\angle$T; $\angle$Q corresponds to$\angle$U; $\angle$R corresponds to$\angle$V; TU; QR corresponds to UV; PR corresponds to TV **b)** $\angle$A corresponds to $\angle$Y; $\angle$B corresponds to $\angle$W; $\angle$C corresponds to $\angle$X; AB corresponds to YW; AC corresponds to YX; BC corresponds to WX

4. YES. The triangles are similar because the corresponding sides are proportional in length.

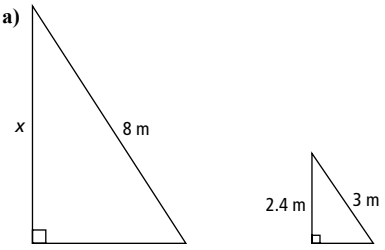
5. 56

6. NO. The triangles are not similar because the corresponding sides are not proportional in length.

Apply

7. The ramp is 2.4 m high.

8. a)



b) The longer ladder reaches 6.4 m up the wall. **c)** It reaches 4 m further.

9. a) Yes, they are similar. **b)** No, they are not similar.

Math Link

a) $\angle 1 = 70°$, $\angle 2 = 70°$, $\angle 3 = 40°$, Side 1 = 1.9 cm, Side 2 = 1.8 cm, Side 3 = 1.9 cm **b)** and **c)** Answers will vary.

4.4 Warm Up, page 208

Answers may vary due to measuring. Examples:

1. a) $\angle A = 118°$; $\angle B = 118°$; $\angle C = 57°$; $\angle D = 67°$ **b)** $\angle J = 101°$; $\angle K = 121°$; $\angle L = 100°$; $\angle M = 102°$; $\angle N = 116°$

2. $\angle P = 125°$; $\angle Q = 90°$; $\angle R = 90°$; $\angle S = 55°$; PQ = 1.9 cm; QR = 1.4 cm; RS = 2.9 cm; PS = 1.7 cm

4.4 Similar Polygons, pages 209–214

Working Example 1: Show You Know

NO. The scale factor is not the same for all 4 sides.

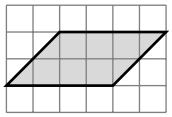
NO. The trapezoids are not similar; the corresponding sides are not proportional.

Working Example 2: Show You Know

9

Communicate the Ideas

1.



Answers will vary. Example: They are similar if the corresponding angles are equal, or if all corresponding sides are proportional.

Practise

2. 6

3. $x = 115°$; $y = 110°$

4. a) YES. Answers will vary. Example: All corresponding sides are proportional with a scale factor of 3.

b) NO. Answers will vary. Example: The corresponding side ST is not proportional to side WX.

Apply

5. YES. The corresponding sides are proportional by a scale factor of 1.

6. The scale factor is 0.4.

7. 4 cm × 2.4 cm

8. The roof is 105 cm, the walls are 157.5 cm, and the floor is 175 cm.

Math Link

Answers will vary.

Graphic Organizer, page 215

Left side:

scale: a comparison between the actual size of an object and the size of its diagram

scale diagram: a drawing that is similar to the actual figure or object

proportion: a relationship that shows that 2 ratios are equal

corresponding angles: angles that have the same relative position in the object

corresponding sides: sides that have the same relative position in the object

similar: have the same shape but different size

Right side:

enlargement: an increase in the size of an object by a constant factor

scale factor: the constant factor by which all dimensions of an object are enlarged or reduced

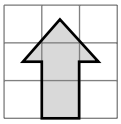
reduction: a decrease in the size of an object by a constant factor

polygon: a two-dimensional closed figure made of three or more line segments

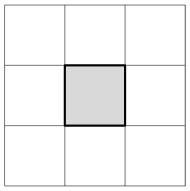
Chapter 4 Review, pages 216–219

1. polygon **2.** reduction **3.** scale factor **4.** similar **5**. proportion

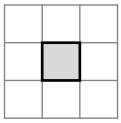
6. 1-cm grid paper:



7. a) 2-cm grid:



b) 0.5-cm grid:



8. The scale factor is 7.

9. a) 14 cm **b)** 13.5 cm

10. a) 1 cm on the map is 100 km. **b)** The scale factor is $\frac{1}{10\,000\,000}$ or 0.0000001.

11. Yes, they are similar because the corresponding sides are proportional by a scale factor of 5.

12. The length of YZ is 11.

13. 3

14. not similar

15. 18 cm

16. EF = 7.2 ; FG = 9.6

Key Word Builder, page 220

1. J **2.** B **3.** G **4.** A **5.** H **6.** C **7.** D **8.** F **9.** E **10.** I

S	S	E	S	E	S	S	N	E	E	G	A	L	G	U	E	N	R	S
E	T	O	R	O	R	S	S	G	P	T	G	L	L	O	N	E	E	I
D	S	R	R	I	S	R	G	E	N	P	O	Y	R	I	L	E	G	S
I	R	O	G	L	G	E	O	N	A	D	A	S	O	D	A	E	O	T
S	E	L	G	N	A	G	N	I	D	N	O	P	S	E	R	R	O	C
G	O	G	O	L	E	N	L	N	S	E	E	N	E	O	G	C	S	I
N	O	I	T	R	O	P	O	R	P	C	E	O	T	P	E	E	G	I
I	S	I	S	G	L	R	C	O	A	L	I	C	P	A	M	A	P	D
D	S	S	Y	T	C	C	T	A	N	L	A	R	L	G	E	R	N	S
N	O	L	A	N	N	E	F	A	E	F	I	E	G	N	N	G	O	L
O	O	C	L	P	O	U	T	E	E	N	G	M	O	O	T	R	L	P
P	D	A	G	A	R	T	G	L	L	U	O	G	I	D	P	I	I	I
S	C	A	L	E	D	I	A	G	R	A	M	T	A	S	R	N	T	N
E	C	E	C	R	L	C	I	C	D	P	C	L	E	C	N	O	I	L
R	U	C	T	E	S	E	N	E	N	U	T	S	L	D	D	T	I	M
R	I	I	R	G	N	E	N	I	D	R	R	R	L	A	C	O	S	P
O	N	C	A	E	L	G	N	E	A	L	A	M	E	N	L	P	T	I
C	O	O	L	D	R	N	R	I	P	M	E	L	N	L	G	R	A	Y
R	T	D	L	N	L	C	T	A	E	N	E	O	G	A	G	N	R	C

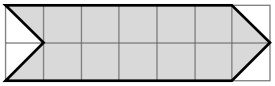
Chapter 4 Practice Test, pages 221–223

1. C **2.** B **3.** D **4.** B

5. scale factor

6. reduction

7. 0.5-cm grid:



8. The scale factor is 4.5.

9. The drawing is 21.3 mm long.

10. a) $\angle A = 70°$, $\angle B = 70°$, $\angle C = 110°$, $\angle D = 110°$, $\angle W = 70°$, $\angle X = 70°$, $\angle Y = 110°$, $\angle Z = 110°$
AB = 4 cm, BC = 3 cm, CD = 2 cm, DA = 3 cm,
WX = 3 cm, XY = 2.3 cm, YZ = 1.5 cm, ZW = 2.3 cm

b) YES. The scale factors are approximately equal. **c)** 0.75

Math Link: Wrap It Up!

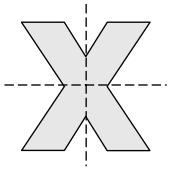
Answers will vary.

Challenge, page 224–225

Answers will vary.

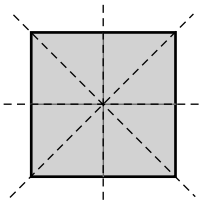
Chapters 1–4 Review, pages 226–231

1. a)



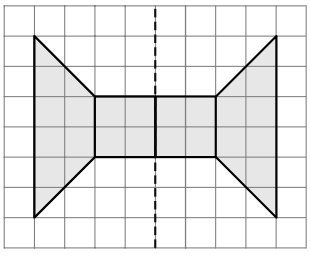
1 horizontal and 1 vertical

b)

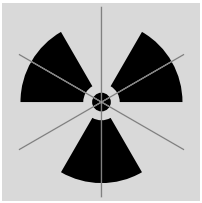


1 horizontal, 1 vertical, and 2 oblique

2.



3. a) 3



b) 3 **c)** 120°; $\frac{1}{3}$

4. a) 25 cm^2 **b)** 450 cm^2 **c)** 400 cm^2

5. $-\frac{3}{4}, -\frac{1}{2}, -0.1, 0.51, 0.\overline{6}$

6. Answers may vary. Example: $\frac{9}{10}$

7. Estimates may vary. Examples: **a)** Estimate: 0; Calculate: $-\frac{3}{20}$

b) Estimate: 4; Calculate: 3.6 **c)** Estimate: $\frac{1}{2}$; Calculate: $\frac{29}{40}$

d) Estimate: 1; Calculate: $\frac{20}{21}$ **e)** Estimate: 0; Calculate: $\frac{1}{3}$

8. 0.9 cm

9. a) $(3 \times 3) \times (3 \times 3 \times 3) = 3^5 = 243$

b) $(4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4) \div (4 \times 4 \times 4 \times 4 \times 4) = 4^2 = 16$

c) $(2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) = 2^8 = 256$

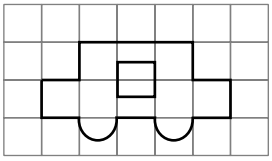
d) $-[(-6) \times (-6)] = -36$

10. a) 3 **b)** 28

11. $(3 \times 7) \times (3 \times 7) \times (3 \times 7) = 3^3 \times 7^3$

12. a) 400 **b)** 1600

13. 1-cm grid paper:



14. a) 3.5 **b)** 25

15. 2.9

16. The actual distance is 600 km.

17. NO. The corresponding sides do not have the same scale factors.

Task, page 232

Answers will vary. Examples:

1. 1 mm, 1.5 mm, 2 mm

2. a) 5, 4, 3 **b)** 5 times

3.

Number of Folds	Thickness of Stack, t	Area of Stack, a
0	t	a
1	$2t$	$\frac{1}{2}a$
2	$4t$	$\frac{1}{4}a$
3	$8t$	$\frac{1}{8}a$
4	$16t$	$\frac{1}{16}a$
5	$32t$	$\frac{1}{32}a$

4. Answers will vary. Example: On the third fold, the thickness is 8 times the original, making the paper hard to fold again. Also, the area is $\frac{1}{8}$ the original size, making it harder to fold.