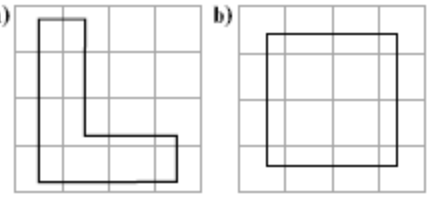
MathLinks 9 Practice and Homework Book
Chapter 4 Answers

4 Get Ready

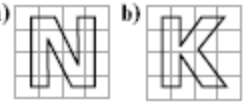
1. a) 5:20 or 5 to 20 b) 9:27 or 9 to 27
   c) 3:18 or 3 to 18
2. a) 1:4 or 1 to 4 b) 1:3 or 1 to 3
   c) 1:6 or 1 to 6
3. a) 0.25, 25% b) $0.3\overline{3}$, $33.\overline{3}\%$ c) $0.1\overline{6}$, $16.\overline{6}\%$
4. a) 6 b) 21 c) 1 d) 2
5. Examples: a) $\frac{2\text{ cm}}{200\text{ cm}} = \frac{1\text{ cm}}{100\text{ cm}}$ b) $\frac{1\text{ cm}}{500\text{ m}} = \frac{7\text{ cm}}{3500\text{ m}}$
   c) $\frac{15\text{ cm}}{300\text{ cm}} = \frac{40\text{ cm}}{800\text{ cm}}$ or $\frac{15\text{ cm}}{3\text{ m}} = \frac{40\text{ cm}}{8\text{ m}}$
6. 0.25 m 7. 100 km

4.1 Enlargements and Reductions

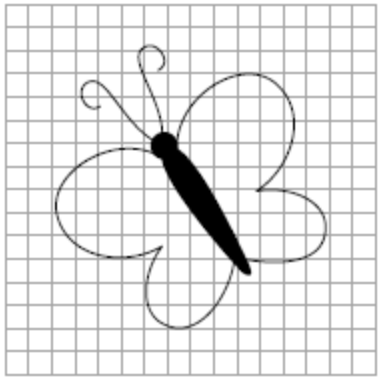
1. a) enlargement, larger
   b) reduction, smaller c) scale factor, constant
2. a) b)



3. a) b)



4. a) equal to 1 b) less than 1 c) greater than 1
5. a) Example:



   b) Example: I measured the various parts of the butterfly, multiplied that measurement by 4, and then drew the part in the new measurement. For example, the body is 5.5 mm long. I drew the larger body 22 mm long.
6. 
7. a) enlargement
   b) approximately 1:2.3. Example: If you measure the A in the newspaper headline and the A in the poster headline, you can find the scale factor.

4.2 Scale Diagrams

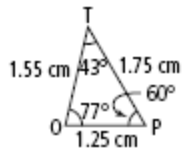
1. d) 2. c) 3. b) 4. a)
5. a) divide 85 by 5, then multiply 1 times the answer b) divide 132 by 6
6. a) 121.5 b) 4 7. a) 130.2 cm b) 2 mm
8. a) $\frac{1}{7.5}$ b) $\frac{1}{4}$ 9. a) $\frac{1}{16.3}$ b) $\frac{1}{13\,333.3}$
10. a) approximately 1:206 or 1:207, depending on how you measure
    b) The scale drawing should be 1.1 cm by 1.5 cm.

    c) 1.65 cm²

4.3 Similar Triangles

1. a) angles b) sides
2. scale factor, proportion
3. a) Yes. They are similar because the corresponding angles are equal and the corresponding sides are proportional.
   b) No. The angles are not equal and the sides are not proportional.
4. a) ∠A and ∠J, ∠B and ∠K, ∠C and ∠L; AB and JK, BC and KL, AC and JL
   b) ∠P and ∠M, ∠Q and ∠N, ∠R and ∠L; PQ and MN, PR and ML, QR and NL
5. △PQR and △VWX are similar. Example: They are both isosceles right triangles with 45° angles on the legs. Corresponding sides are proportional.
6. No. Example: They are not similar because the corresponding sides are not proportional.
7. a) $x = 21$ b) $x = 13.8$

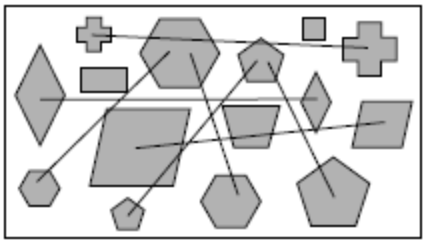
8. Example: Triangle reduced by half.



9. 167 cm

4.4 Similar Polygons

1. False. Polygons that are similar have all corresponding angles equal in measure.
2. False. Example: You can use similar polygons to determine unknown side lengths.
3. False. A polygon is a two-dimensional closed figure made of three or more line segments.
4. a) Yes. Example: They are similar because all side lengths are proportional with a scale factor of 2.
   b) Yes. Example: All side lengths are proportional with a scale factor of 1.7.
5. a)

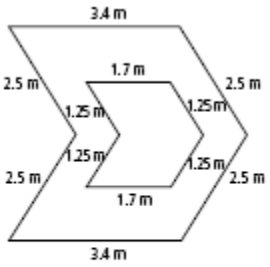


b)

c) Examples:

6. a) $x = 1.7$ b) $x = 2.25$, $y = 12$

7. a)



b) 25.2 m

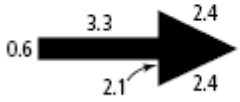
8. $x = 6.3$; $y = 6.7$; $z = 5.0$
9. 160 cm

4 Chapter Link

1. a) Answers may vary. Examples:
   - Making every square on the small visual equal to two squares on the enlargement would double the size of the logo.
   - Making every square on the small visual equal to 1.5 squares on the enlargement would produce a logo one and a half times the original size.

   b) Examples:
   - The scale factor is 1:2. I made each dimension twice the size of the original.
   - The scale factor is 1:1.5. I made each dimension one and a half times the size of the original.

2.

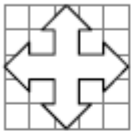


4 Vocabulary Link

1. e) ratio
2. c) polygon
3. f) reduction
4. j) similar
5. g) scale
6. a) corresponding
7. b) enlargement
8. i) scale factor
9. h) scale diagram
10. d) proportion

H	U	H	P	G	B	T	Q	G	G	I	J	S	E	Z	D	S	D	F	Q
I	A	L	S	S	F	Z	G	B	W	R	D	K	C	O	H	H	E	B	G
Q	T	M	F	C	H	S	I	M	I	L	A	R	L	A	X	Z	D	J	S
R	B	L	F	A	U	J	R	M	V	X	W	E	X	W	K	D	J	J	W
O	U	C	T	L	C	B	Z	U	M	V	M	S	B	C	P	M	U	F	A
Q	C	M	N	E	V	Q	S	U	E	N	L	A	R	G	E	M	E	N	T
N	C	D	R	F	S	G	Q	C	R	L	U	X	C	S	C	P	D	C	P
P	E	O	N	A	D	J	Q	Z	A	A	M	K	Z	X	S	U	H	E	D
R	E	D	U	C	T	I	O	N	T	L	R	P	Q	S	V	F	W	Q	C
O	V	Q	T	T	S	I	B	P	I	Y	E	W	O	V	Y	C	Q	B	F
P	B	D	R	O	T	U	N	K	O	A	B	D	K	L	L	E	F	O	W
O	K	R	E	R	X	B	A	N	Y	Q	L	Z	I	F	Y	N	C	L	N
R	C	O	R	R	E	S	P	O	N	D	I	N	G	A	H	G	L	W	G
T	L	C	T	O	P	J	S	I	W	P	U	E	K	J	G	T	O	G	K
I	M	D	Y	O	F	E	C	K	K	L	J	C	B	C	A	R	A	N	I
O	K	L	F	U	J	T	A	M	U	J	U	U	K	U	M	M	A	D	L
N	P	Z	Y	C	G	J	L	O	E	M	U	Y	K	O	B	E	S	M	P
B	F	T	R	V	Z	P	E	D	N	B	H	B	K	Q	Q	X	U	Q	Z

Chapters 1–4 Review

1. $4^7 = 4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4 = 16\,384$;
   $7^4 = 7 \times 7 \times 7 \times 7 = 2401$
2. There is rotational symmetry of order 2.
3. 
4. a) $-12\,025$ b) $-8\frac{8}{27}$
5. a) hexagon, rectangle, square, diamond, triangle
   b) hexagon: order 6, 60°, $\frac{1}{6}$; rectangle: order 2, 180°, $\frac{1}{2}$; square: order 4, 90°, $\frac{1}{4}$; diamond: order 2, 180°, $\frac{1}{6}$; triangle: order 6, 60°, $\frac{1}{6}$
6. a) $-3\frac{53}{120}$ b) $-20\frac{5}{18}$ c) $-3\frac{14}{25}$
7. $\frac{1}{3000}$ 8. a) $23 \div 53$ b) $4^4 \div 9^4$
9. 1679.18 cm² 10. a) \$1759.02 b) \$259.02
11. BC = 5 cm
12. Example: Calculate the surface area of one half of the roof, the front, and one side of the birdhouse. Because the other half of the roof, the back, and the other side of the birdhouse are identical to the first set of calculations, multiply the answer by two. Then, subtract the hole and add the sides of the cylindrical perch, but not the end of the perch.
13. a) 2.45 m b) 5.34 m