Answers for 6.7

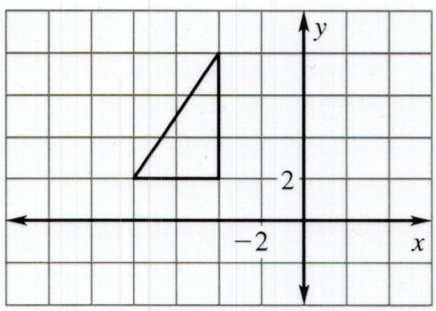
For use with pages 412–416

6.7 Skill Practice

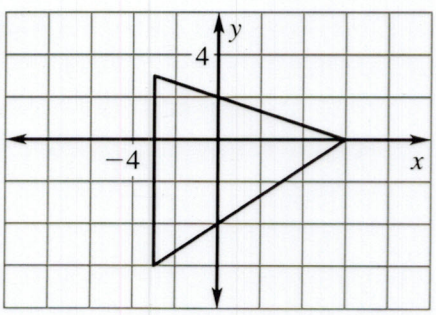
1. similar

2. Find the ratio of a side length of the image to the corresponding side length of the original figure; suppose k is the scale factor, if $0 < k < 1$ the dilation is a reduction. If $k > 1$ the dilation is an enlargement.

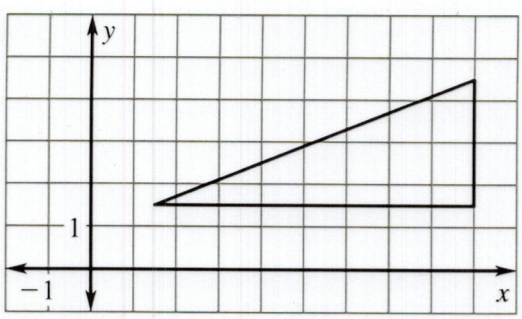
3.



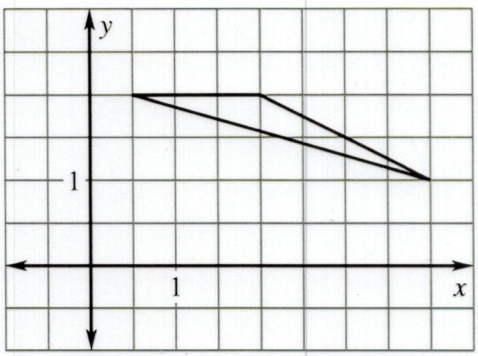
4.



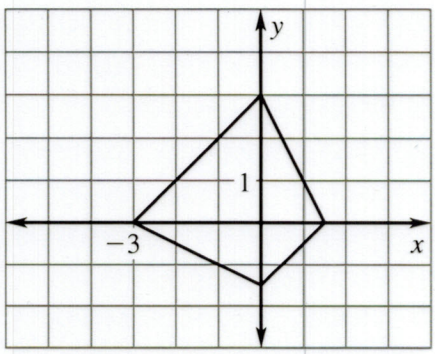
5.



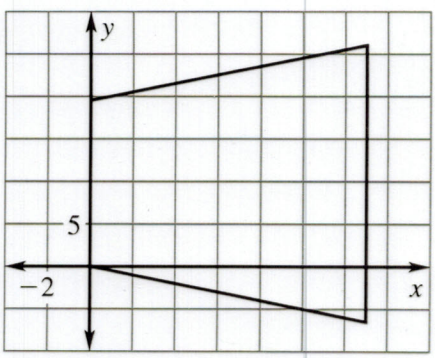
6.



7.



8.



9. reduction; $\frac{1}{2}$

10. enlargement; $\frac{3}{2}$

11. enlargement; 3

12. reduction; $\frac{1}{3}$

13. C

14. The scale factor should be the ratio of the image to the original rather than the ratio of the original to the image; $\frac{5}{2}$.

15. The figures are not similar.

16. rotation **17.** reflection

18. dilation

19. 2; $m = 4, n = 5$

20. $\frac{3}{4}$; $p = 4, q = 12, r = 4$

21. C

22. The result of both dilations is the original figure.

23. *Sample answer:* $(x, y) \rightarrow (-x, y) \rightarrow (2x, 2y)$

24. *Sample answer:* $(x, y) \rightarrow \left(\frac{1}{3}x, \frac{1}{3}y\right) \rightarrow (x - 2, y + 3)$

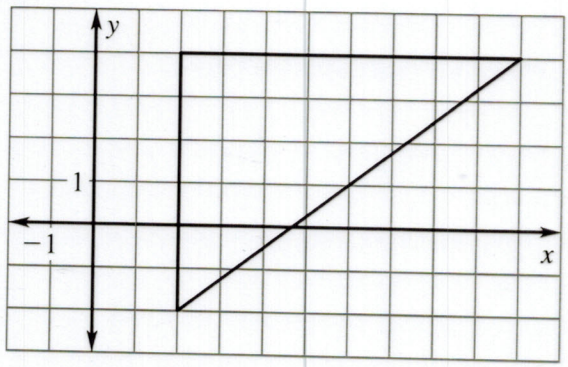
6.7 Problem Solving

25. 24 ft by 12 ft

26. $\frac{5}{8}$ **27.** $\frac{5}{2}$

28. Multiply the coordinates of the smallest quadrilateral by 2, 3, and 4 to create each of the larger quadrilaterals.

29. a.



b. $\frac{2}{3}$; they are the same.

c. $\frac{4}{9}$; it's the square of the scale factor.

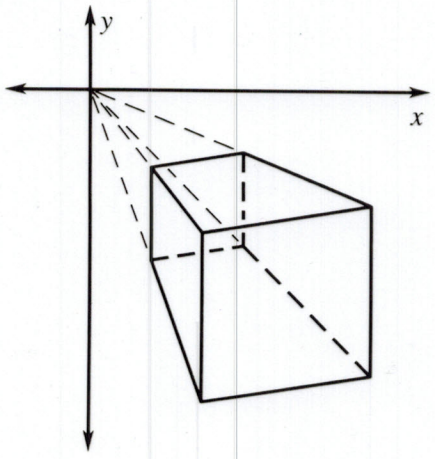
30. a. It would be a reduction.

b. It would be an enlargement.

c. It would be a rotation of 180°.

31. Perspective drawings use converging lines to give the illusion that an object is three-dimensional. Since the back of the drawing is similar to the front, a dilation can be used to create this illusion with the vanishing point as the center of dilation.

31. (cont.)



32. Let $P(a, b)$and $Q(c, d)$ be the coordinates of the endpoints of $\overline{PQ}$ with midpoint $\left(\frac{a+c}{2}, \frac{b+d}{2}\right)$. Since $\overline{XY}$ is a dilation of $\overline{PQ}$ with scale factor k, you have $X(ka, kb)$ and $Y(kc, kd)$ with midpoint $\left(\frac{ka+kc}{2}, \frac{kb+kd}{2}\right)$. Thus, $k\left(\frac{a+c}{2}, \frac{b+d}{2}\right) = \left(\frac{ka+kc}{2}, \frac{kb+kd}{2}\right)$.

33. The slope of $\overline{PQ}$ is $\frac{d-b}{c-a}$ and the slope of $\overline{XY}$ is $\frac{kd-kb}{kc-ka} = \frac{k(d-b)}{k(c-a)} = \frac{d-b}{c-a}$. Since the slopes are the same, the lines are parallel.

34. Use a scale factor of $\sqrt{2}$; use a scale factor of $\sqrt{n}$.

6.7 Mixed Review

35. $10x^2 + 2x + 29$

36. $b^2 + a^2$

37. $4ab$

38. $2\sqrt{5}$

39. $\sqrt{41}$

40. $\sqrt{29}$

41. 4

42. $x = 5, y = 5$

43. $x = 20, y = 90, z = 4$

6.4–6.7 Mixed Review of Problem Solving

1. $\frac{XW}{XV} = \frac{XY}{XZ}$

2. a. Use the AA Similarity Postulate since $\angle D$ and $\angle B$ are right angles and $\angle ACD \cong \angle EDC$ by the Vertical Angles Congruence Theorem.

b. 1.5 mi

c. 12.5 mi

3. 63 ft; set up the proportion $\frac{6}{8} = \frac{x}{84}$ and solve for x.

4. Sometimes. *Sample answer:* One possibility is for line ℓ_2 to be vertical with ℓ_1 and ℓ_3 being non-vertical lines so that the ratios of lengths $2x : x$ and $2y : y$ are achieved. In this case, ℓ_1, ℓ_2, and ℓ_3 are not parallel. It is also possible for lines ℓ_1, ℓ_2, and ℓ_3 to be parallel (as they appear in the diagram) with the line labeled with $2x$ and $2y$ drawn at enough of an angle to the three parallel lines so that the ratios of lengths $2x : x$ and $2y : y$ are achieved.

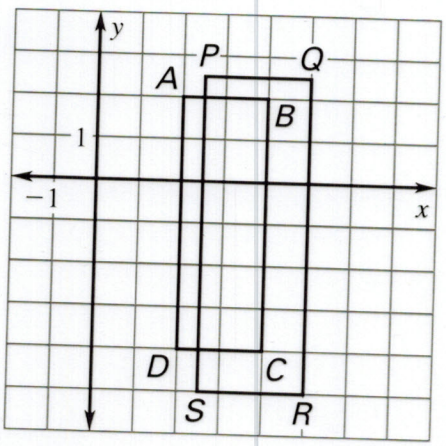
5. 5.4 m;

	5	.	4
	⊘	⊘	
●	●	●	●
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

6. 0.4;

	0	.	4
	⊘	⊘	
●	●	●	●
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

7. a.



b. $\frac{5}{4}$; they are the same.

c. $\frac{25}{16}$; it's the square of the scale factor.