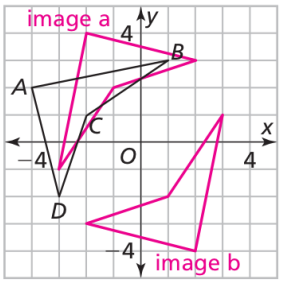
Butterflies, Pinwheels, and Wallpaper Answers

Investigation 3 Additional Practice

10. a. The final image is labeled image a in the figure below.

b. The final image is labeled image b in the figure below.

c. The images are not the same. Rotating a figure 90° counterclockwise about the origin and then reflecting it over the x-axis takes point (x, y) to $(-y, x)$ and then to $(-y, -x)$. Reflecting a figure over the x-axis and then rotating it 90° counterclockwise about the origin takes point (x, y) to $(x, -y)$ and then to (y, x).



11. a 360° rotation about the origin or the identity transformation

12. a single reflection over the y-axis

13.

	A	B	C	D	E
a.	(0, 0)	(0, 4)	(2, 3)	(4, 4)	(4, 0)
b.	(0, 0)	(0, −4)	(2, −3)	(4, −4)	(4, 0)
c.	(0, 0)	(0, 4)	(−2, 3)	(−4, 4)	(−4, 0)

14. (Figure 1)

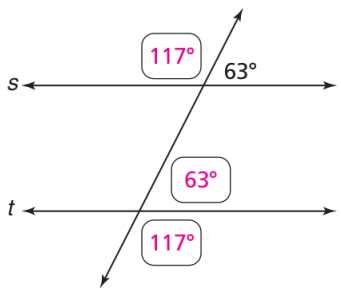
	A	B	C	D	E
a.	(−2, 0)	(−2, 4)	(0, 3)	(2, 4)	(2, 0)
b.	(−2, 0)	(−2, −4)	(0, −3)	(2, −4)	(2, 0)
c.	(2, 0)	(2, 4)	(0, 3)	(−2, 4)	(−2, 0)

25. *a:* 128°, *b:* 52°, *c:* 128°, *d:* 128°, *e:* 52°, *f:* 128°, *g:* 52°

26. $x = 50$

27. Yes: because quadrilateral $ABCD$ is a parallelogram, both sets of opposite sides are parallel, and the sides form transversals that cut parallel lines. This means $\angle ABD$ is congruent to $\angle CDB$ and $\angle ADB$ is congruent to $\angle CBD$. The side between these two pair of angles is $\overline{AD}$ in both triangles, so the triangles are congruent by ASA.

28.



29.

Point	Transformation	Coordinates of the Image
(2, 1)	Reflection in the x-axis	(2, −1)
(2, 0)	Reflection in the x-axis	(2, 0)
(2, −1)	Reflection in the x-axis	(2, 1)

30. $(x, y - 4)$

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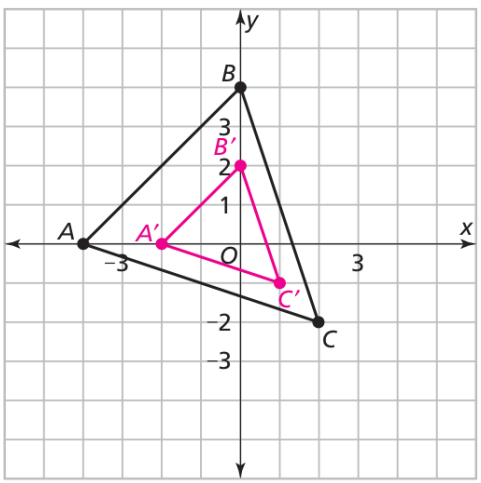
Skill: Transforming Coordinates

10. $(x + 4, y - 3)$
11. $(x - 2, y - 2)$
12. $(x + 3, y + 1)$
13. $(x, y + 2)$
14 $(x - 7, y + 3)$
15. $(x - 2, y - 8)$
16. $(-y, x)$
17. $(-x, -y)$

Investigation 4 Additional Practice

1.



2. a. 18.3 units
b. 9.2 units; The perimeters are related by the scale factor, $\frac{1}{2}$.

3. They are related by the square of the scale factor.

4. a. AB: 1; BC: -3; CA: $-\frac{1}{3}$
b. Answers will vary, but might include discussion of parallel segments having equal slopes. $A'B'$: 1; $B'C'$: -3; $C'A'$: $-\frac{1}{3}$

5. a. 1.5 or $\frac{3}{2}$
b. $\frac{2}{3}$

6. a. Possible answer: their lengths will be related by the same scale factor as the sides.
b. $RC = 10$ inches and $R'C' = 15$ inches

7. a. Possible answer: the perimeter of $R''E''C''T''$ will be the same as the perimeter of $R'E'C'T'$, because a turn doesn't change the size. Since the

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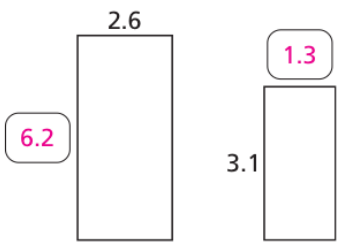
19. 16 feet

20. 40 inches or $3\frac{1}{3}$ feet

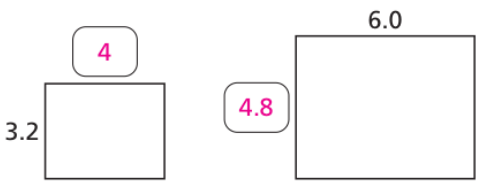
21. **a.** 0.5
b. 2.5

22. $\frac{3}{4}$

23. **a.**



b.



Skill: Scale Factors

11. $a \approx 3.18; b = 2.2$

12. $a = 120; b = 400; c = 300$

13. 54 inches

14. 25 square centimeters