Lesson 2 Practice Problems

1. Match each coordinate rule to a description of its resulting transformation.

A. $(x, y) \rightarrow (x + 3, y)$

B. $(x, y) \rightarrow (2x, 2y)$

C. $(x, y) \rightarrow (x, y + 4)$

D. $(x, y) \rightarrow (x, y - 4)$

E. $(x, y) \rightarrow (x - 3, y + 4)$

1. Translate by the directed line segment from $(0, 0)$ to $(0, 4)$.

2. Translate by the directed line segment from $(0, 0)$ to $(3, 0)$.

3. Dilate using the origin as the center and a scale factor of 2.

4. Translate by the directed line segment from $(0, 0)$ to $(0, -4)$.

5. Translate by the directed line segment from $(0, 0)$ to $(-3, 4)$.

2. a. Draw the image of triangle ABC under the transformation $(x, y) \rightarrow (x - 4, y + 1)$. Label the result T.

b. Draw the image of triangle ABC under the transformation $(x, y) \rightarrow (-x, y)$. Label the result R.
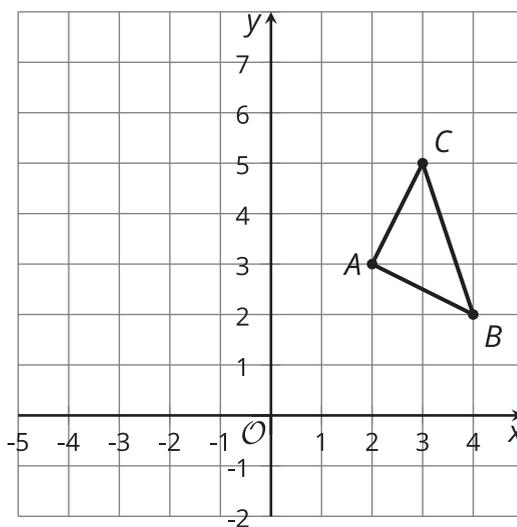
3. Here are some transformation rules. For each rule, describe whether the transformation is a rigid motion, a dilation, or neither.

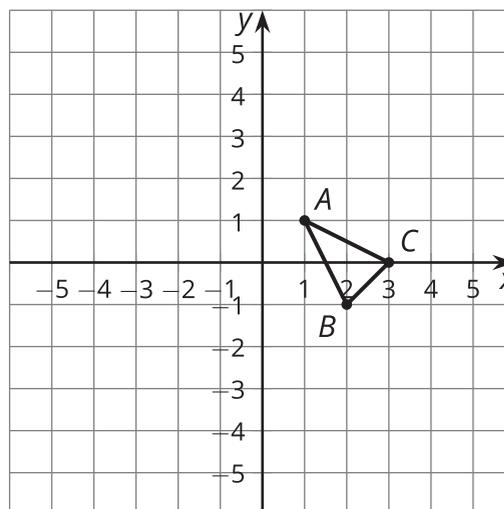   a. $(x, y) \rightarrow (x - 2, y - 3)$

    b. $(x, y) \rightarrow (2x, 3y)$

    c. $(x, y) \rightarrow (3x, 3y)$

    d. $(x, y) \rightarrow (2 - x, y)$

4. Reflect triangle ABC over the line $x = 0$. Call this new triangle $A'B'C'$. Then reflect triangle $A'B'C'$ over the line $y = 0$. Call the resulting triangle $A''B''C''$.

Which single transformation takes ABC to $A''B''C''$?

A. Translate triangle ABC by the directed line segment from $(1, 1)$ to $(-2, 1)$.

B. Reflect triangle ABC across the line $y = \text{-}x$.

C. Rotate triangle ABC counterclockwise using the origin as the center by 180 degrees.

D. Dilate triangle ABC using the origin as the center and a scale factor of 2.

(From Unit 6, Lesson 1.)

5. Reflect triangle ABC over the line $y = 2$.

   Translate the image by the directed line segment from $(0, 0)$ to $(3, 2)$.

   What are the coordinates of the vertices in the final image?
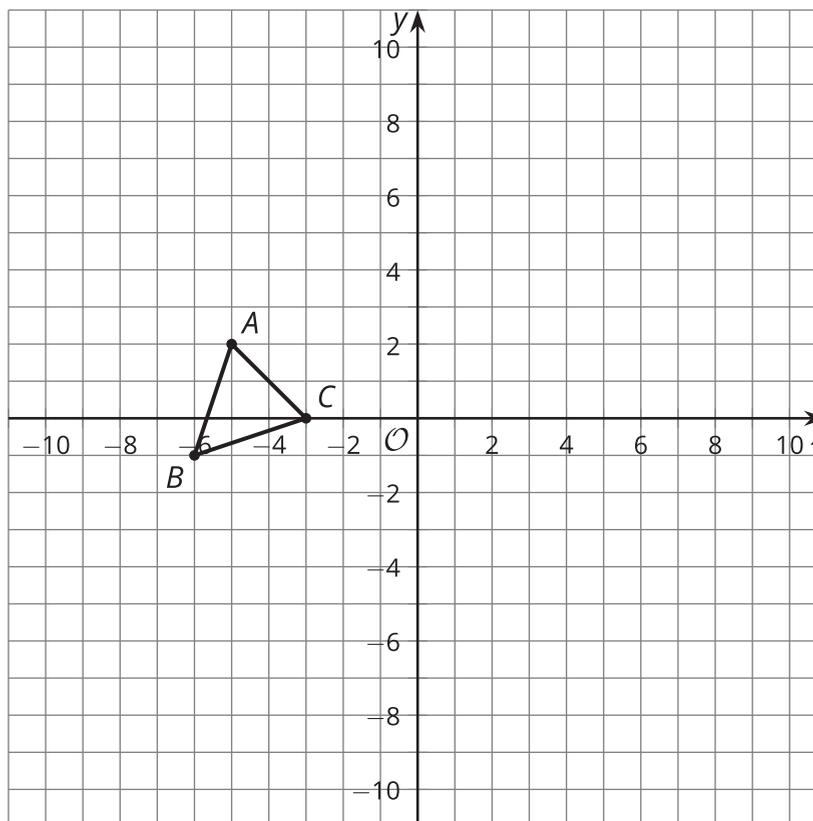
6. The density of water is 1 gram per cm³. An object floats in water if its density is less than water's density, and it sinks if its density is greater than water's. Will a cylindrical log with radius 0.4 meters, height 5 meters, and mass 1,950 kilograms sink or float? Explain your reasoning.
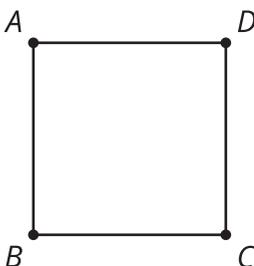
7. These 3 congruent square pyramids can be assembled into a cube with side length 3 feet. What is the volume of each pyramid?
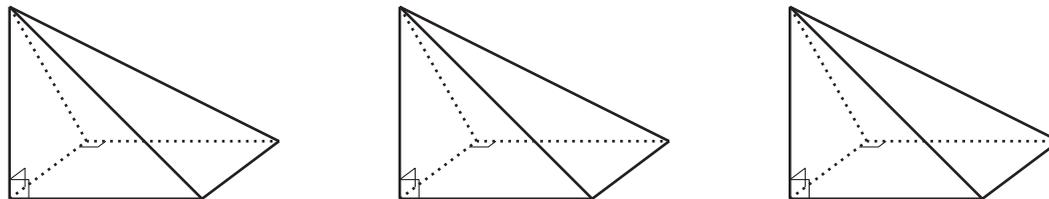
A. 1 cubic foot

B. 3 cubic feet

C. 9 cubic feet

D. 27 cubic feet

(From Unit 5, Lesson 12.)

8. Reflect square $ABCD$ across line CD. What is the ratio of the length of segment AA' to the length of segment AD? Explain or show your reasoning.

(From Unit 2, Lesson 1.)