Similar Figures and Dilations Worksheet

Grade 8 · Common Core 8.G.A.4

> Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Practice

Builds the skill step by step.

1. Two figures are similar when...
   A. they have exactly the same size
   B. they have the same perimeter
   C. one can be moved onto the other by rotations, reflections, translations and dilations
   D. they have the same area

2. A triangle with sides of 3, 4 and 5 cm is dilated by a scale factor of 2. What are the side lengths of the image?

3. A 4 cm by 6 cm rectangle is dilated to make a 10 cm by 15 cm rectangle. What is the scale factor?

4. Are a 2 by 5 rectangle and a 4 by 10 rectangle similar? Answer Yes or No.

5. Are a 2 by 5 rectangle and a 4 by 7 rectangle similar? Answer Yes or No.

6. Triangle ABC is similar to triangle DEF, with A matching D, B matching E and C matching F. AB = 6, DE = 9 and BC = 8. What is EF?

7. Which transformation can change the size of a figure?

   A. A translation

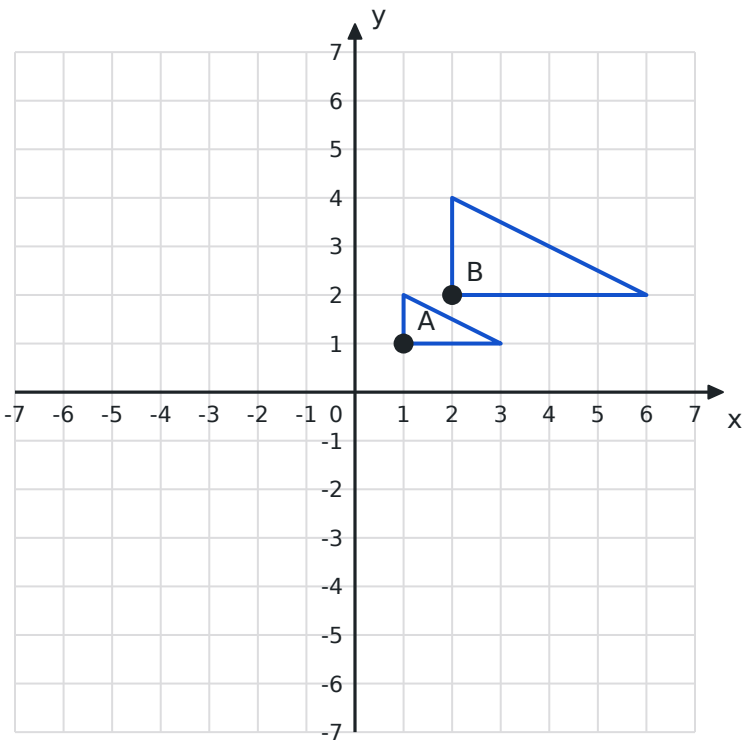
   B. A dilation

   C. A rotation

   D. A reflection

8. Triangle PQR is dilated by a scale factor of 3 to make triangle P′Q′R′. ∠P = 52°. What is ∠P′?

9. Triangle B is a dilation of triangle A with the center at the origin. What is the scale factor?



10. A square with sides of 9 units is dilated by a scale factor of $\frac{1}{3}$. How long is each side of the image?

ALBERT

Name _____ Date _____

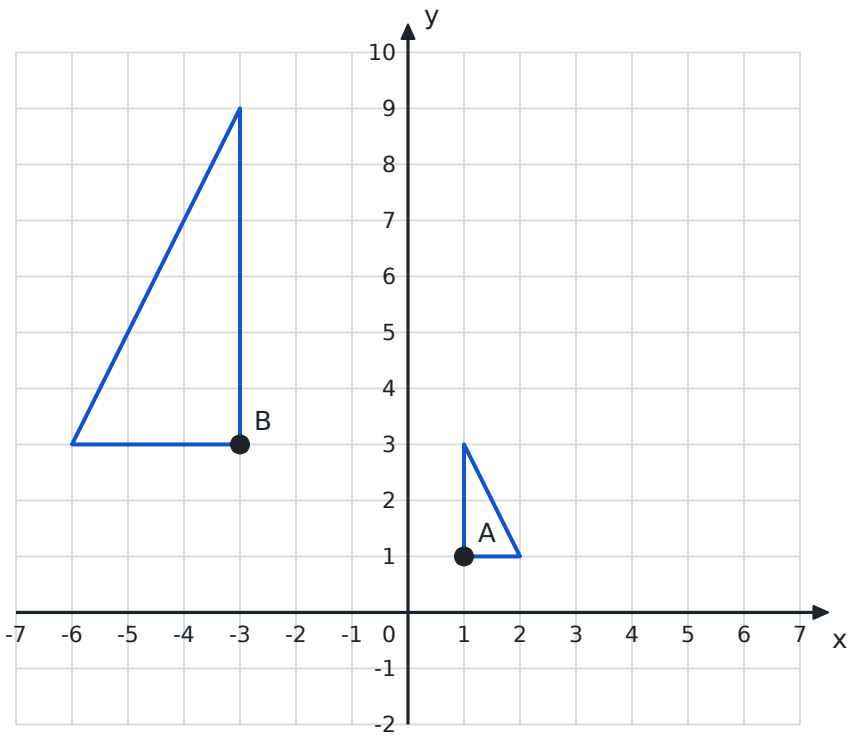
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On Level

Grade-level practice.

1. Which sequence maps triangle A onto triangle B?



   A. Dilate by a scale factor of 3 with the center at the origin only

   B. Translate 4 units left and 2 units up

   C. Reflect across the x-axis, then dilate by a scale factor of 3

   D. Dilate by a scale factor of 3 with the center at the origin, then reflect across the y-axis

2. A triangle has sides of 5, 7 and 9 inches. A similar triangle has a shortest side of 15 inches. How long is its longest side?

3. At the same time of day, a 6-foot person casts a 4-foot shadow and a tree casts a 22-foot shadow. The two triangles formed are similar. How tall is the tree?

4. Is a 3 by 8 rectangle similar to a 6 by 12 rectangle? Explain.

5. A triangle has angles of 40° and 65°. A similar triangle is twice as large. What is the measure of the third angle of the larger triangle?

6. Triangle STU is a dilation of triangle PQR with a scale factor of 0.75, with P matching S, Q matching T and R matching U. PR = 20 cm. What is SU?

7. Which statement is NOT always true of two similar figures?

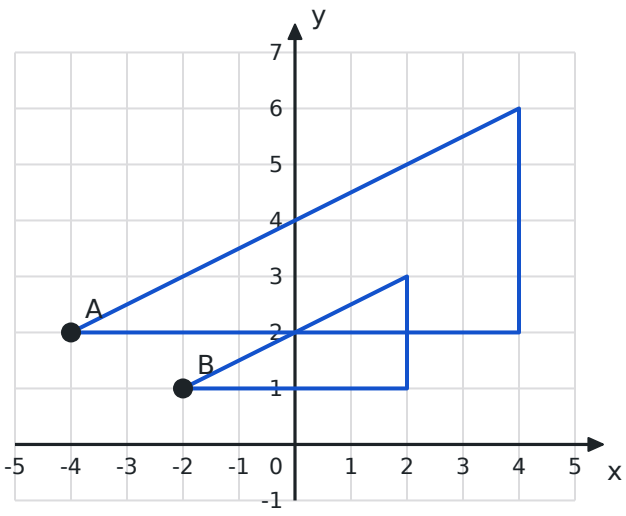
   A. Their corresponding sides are equal in length.

   B. Their corresponding angles are equal.

   C. Their corresponding sides are in proportion.

   D. They have the same shape.

8. Triangle B is a dilation of triangle A with the center at the origin. What is the scale factor?



9. Two triangles are similar. The larger one is a dilation of the smaller one by a scale factor of 3. The smaller triangle has a perimeter of 14 cm. What is the perimeter of the larger one?

10. One triangle has angles of 35° and 80°. Another has angles of 35° and 65°. Are the triangles similar?

    A. No, because the second angles are different.

    B. Yes, because all three angles match.

    C. Yes, because any two triangles are similar.

    D. It can't be told without side lengths.

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Challenge

Multi-step and word problems that stretch it.

1. Triangle ABC is similar to triangle DEF, with A matching D, B matching E and C matching F. AB = 4, BC = 6, DE = 10 and EF = x + 3. What is x?

2. A rectangle with an area of 20 square units is dilated by a scale factor of 3. What is the area of the image?

3. Ravi says a 2 by 3 rectangle and a 4 by 5 rectangle are similar because he added 2 to each side. What is the error?

   A. Similar figures multiply sides by the same factor; 4 ÷ 2 = 2 but 5 ÷ 3 is not 2, so they are not similar.

   B. There is no error; adding the same amount keeps the shape.

   C. They are similar because both are rectangles with four right angles.

   D. They are not similar because one rectangle is larger.

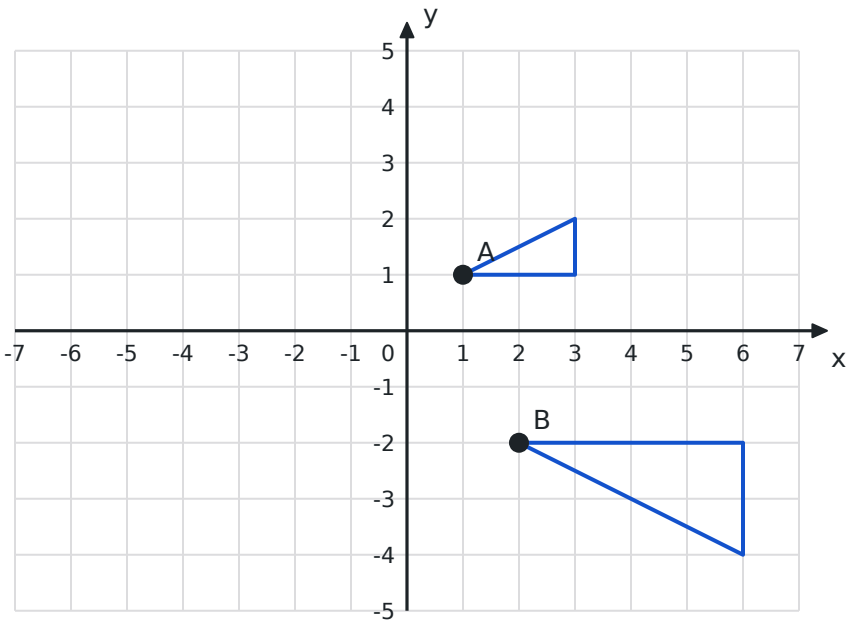
4. The point (2, −3) is dilated by a scale factor of 2 with the center at the origin, then translated 1 unit left and 4 units up. Where does it end up?

5. Explain why any two squares are similar.

6. A 4 in. by 6 in. photo is enlarged to a similar photo whose short side is 10 in. How long is the long side of the enlargement?

7. One triangle has sides of 6, 9 and 12 cm. Another has sides of 4, 6 and 8 cm. What scale factor maps the first triangle onto the second?

8. Which sequence maps triangle A onto triangle B?



A. Reflect across the y-axis, then dilate by a scale factor of 2

B. Dilate by a scale factor of 2, then rotate 90° clockwise about the origin

C. Dilate by a scale factor of 2 with the center at the origin, then reflect across the x-axis

D. Translate 1 unit right and 3 units down

9. A small right triangle has legs of 4 m and 3 m. A larger, similar right triangle has a 12 m leg matching the 4 m leg. How long is its other leg?

10. Two similar triangles have corresponding sides in the ratio 2 : 5. The smaller triangle's perimeter is 18 cm. What is the larger triangle's perimeter?