Congruence and Transformations Worksheet

Grade 8 · Common Core 8.G.A.2

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

Practice

Builds the skill step by step.

1. Two figures are congruent when…

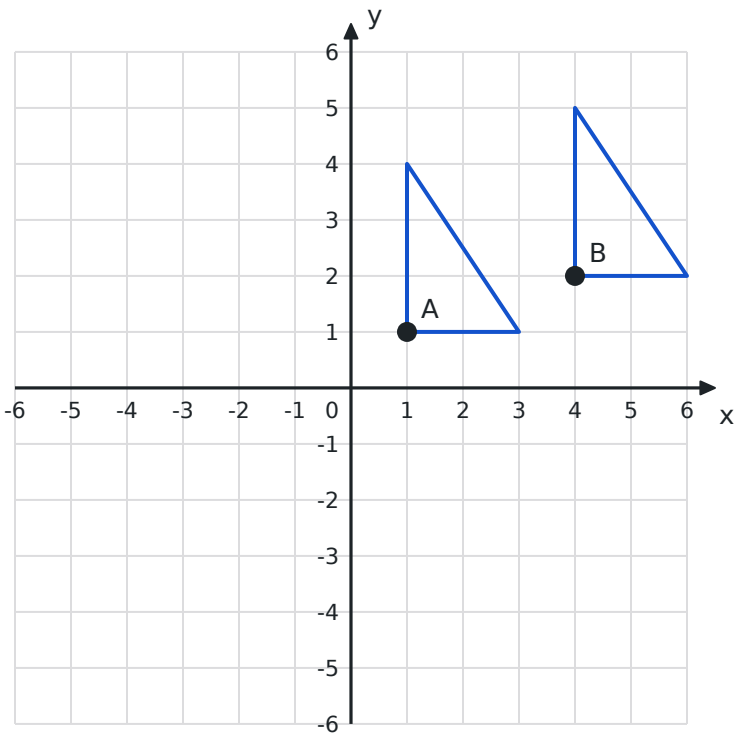
   A. one can be moved exactly onto the other by rotations, reflections and translations

   B. they have the same shape but may be different sizes

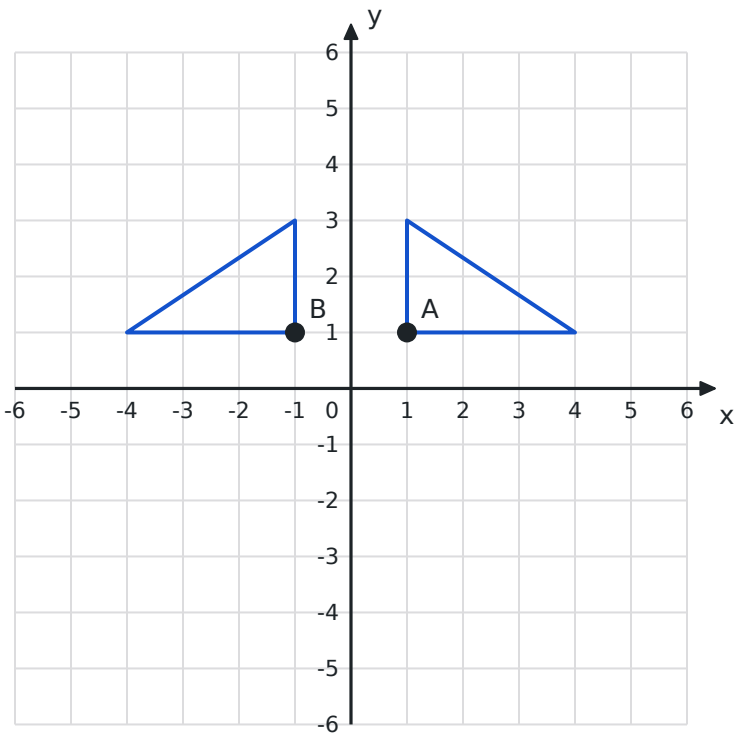
   C. they have the same area

   D. they have the same perimeter

2. Triangle A is translated onto triangle B. How many units right and how many units up does it move?



3. Which single transformation maps triangle A onto triangle B?



A. A rotation of 90° about the origin

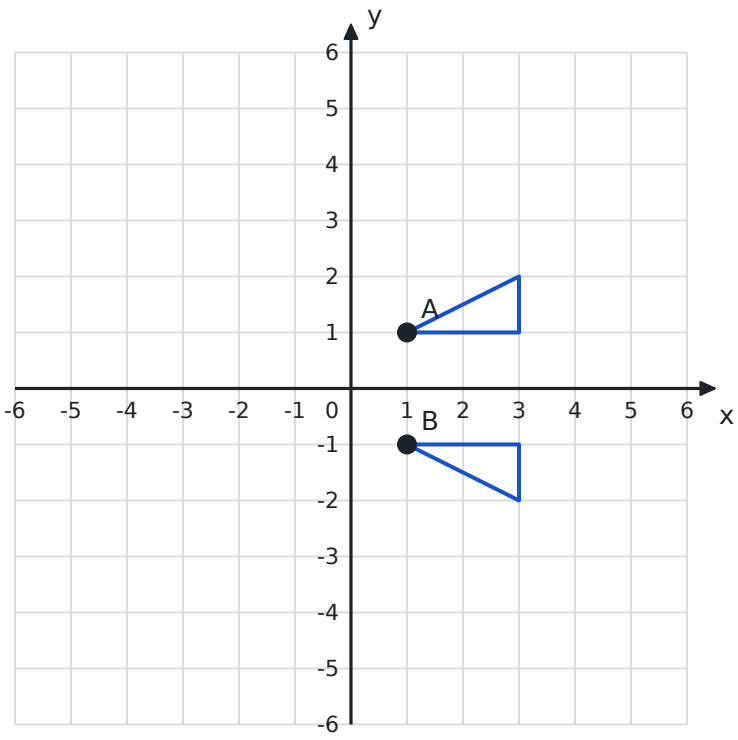
B. A reflection across the y-axis

C. A translation 5 units left

D. A reflection across the x-axis

4. One square has sides of 3 cm. Another square has sides of 4 cm. Are the squares congruent? Answer Yes or No.

5. Which single transformation maps triangle A onto triangle B?



A. A translation 2 units down

B. A reflection across the y-axis

C. A reflection across the x-axis

D. A rotation of 180° about the origin

6. One rectangle is 5 units wide and 2 units tall. Another is 2 units wide and 5 units tall. Are they congruent? Answer Yes or No.

7. Which pair of triangles is NOT congruent?

A. Sides of 3, 4 and 5 cm, and sides of 5, 3 and 4 cm

B. Sides of 2, 2 and 3 cm, and sides of 3, 2 and 2 cm

C. Sides of 7, 7 and 7 cm, and sides of 7, 7 and 7 cm

D. Sides of 3, 4 and 5 cm, and sides of 6, 8 and 10 cm

8. Figure A is translated 4 units left and 2 units down to make figure B. The point (3, 5) is on figure A. Where is its image on figure B?

9. Triangle ABC is congruent to triangle DEF, with A matching D, B matching E and C matching F. Which side matches AB?

   A. DF

   B. FD

   C. EF

   D. DE

10. Triangle JKL is congruent to triangle PQR, with J matching P and K matching Q. JK = 7 cm. What is PQ?

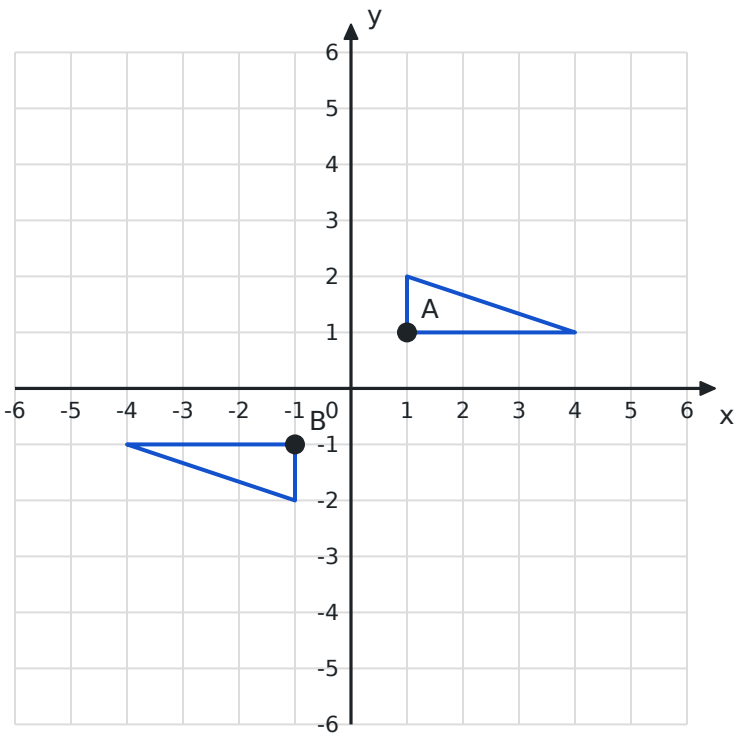
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On Level

Grade-level practice.

1. Which transformation maps triangle A onto triangle B?



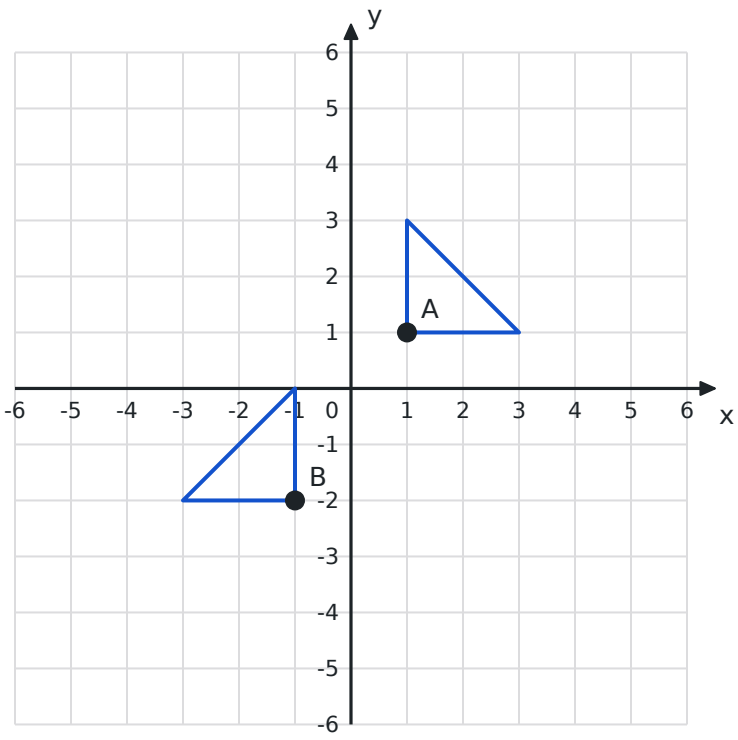
A. A translation 2 units left and 2 units down

B. A reflection across the x-axis

C. A rotation of 180° about the origin

D. A reflection across the y-axis

2. Which sequence maps triangle A onto triangle B?



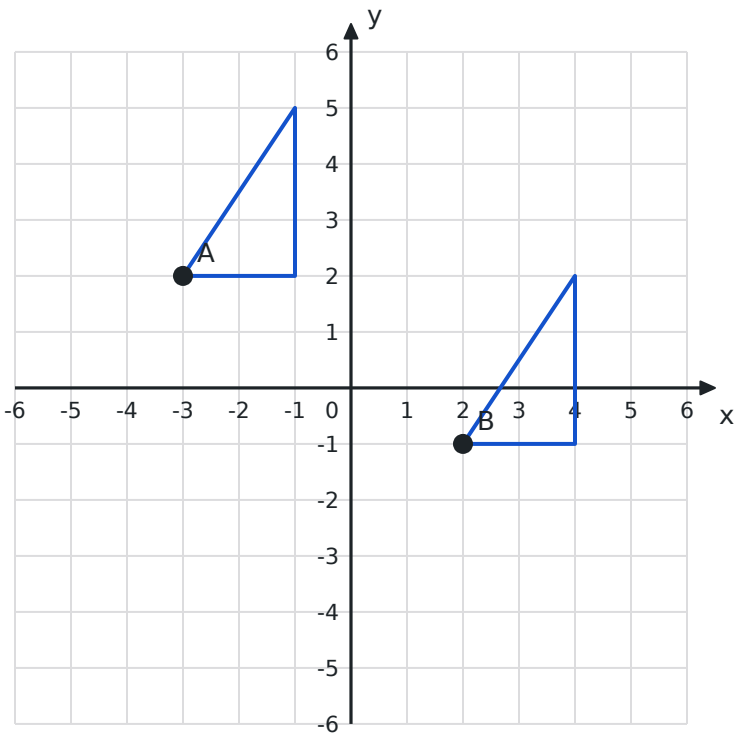
A. Reflect across the y-axis, then translate 3 units down

B. Reflect across the x-axis, then translate 2 units left

C. Translate 3 units down only

D. Rotate 90° clockwise about the origin

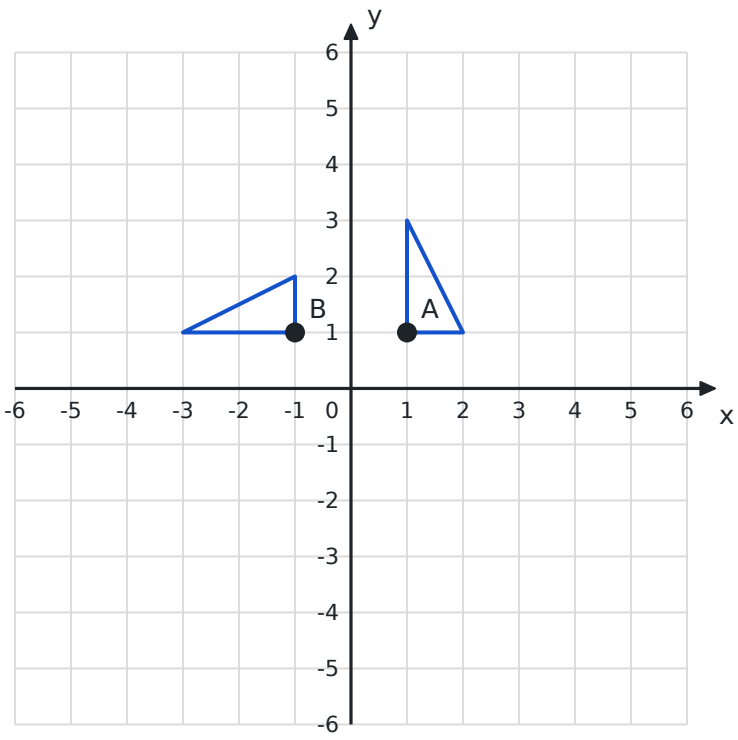
3. Triangle A is translated onto triangle B. How many units right and how many units down does it move?



4. One triangle has sides of 5, 5 and 6 cm. Another has sides of 5, 6 and 6 cm. Are they congruent? Explain.

5. Triangle ABC is congruent to triangle XYZ, with A matching X, B matching Y and C matching Z. $\angle A = 40°$ and $\angle B = 75°$. What is $\angle Z$?

6. Which transformation maps triangle A onto triangle B?



A. A rotation of 90° clockwise about the origin

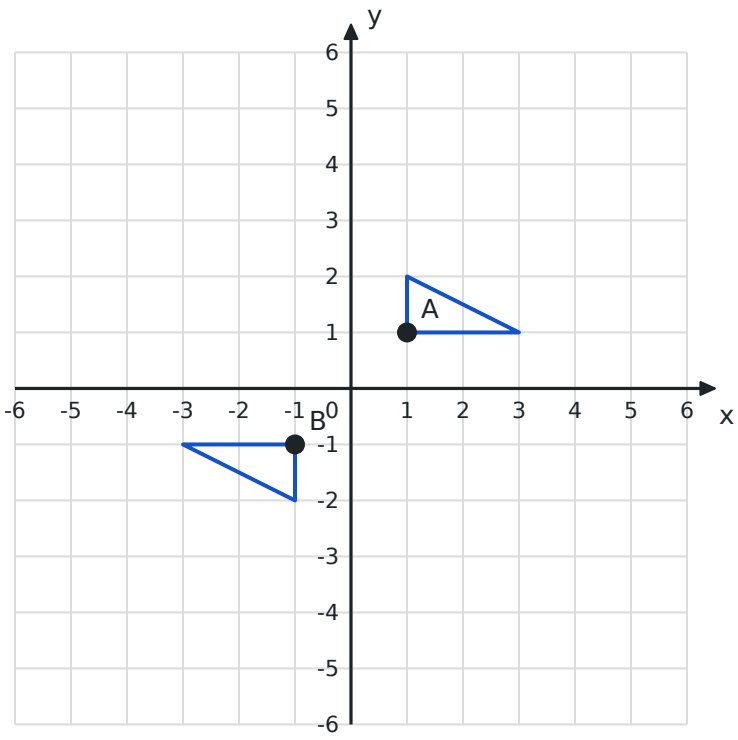
B. A rotation of 90° counterclockwise about the origin

C. A rotation of 180° about the origin

D. A reflection across the y-axis

7. Quadrilateral ABCD is congruent to quadrilateral EFGH, with the vertices matching in order. ∠C = 98°. What is ∠G?

8. Which sequence does NOT map triangle A onto triangle B?



A. Reflect across the y-axis, then reflect across the x-axis

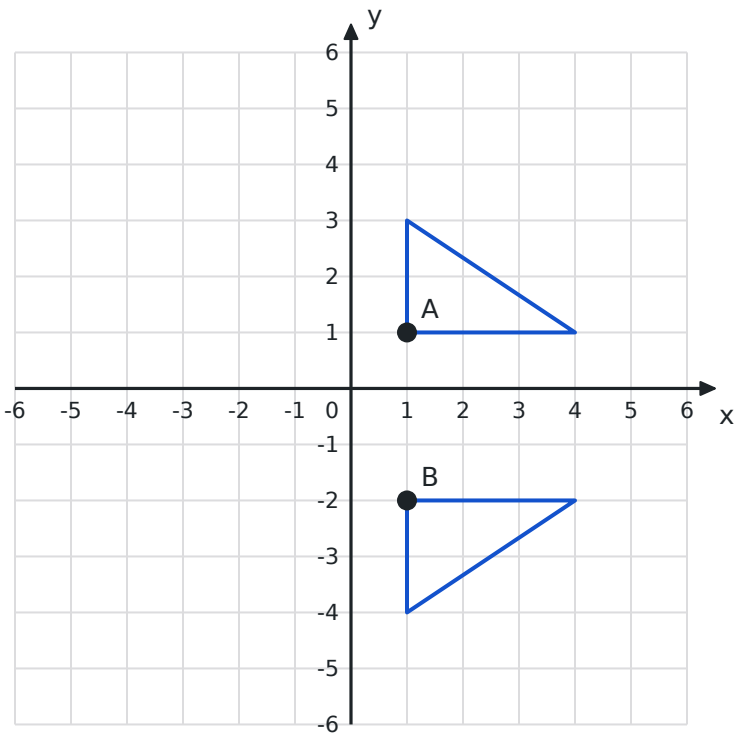
B. Reflect across the x-axis, then reflect across the y-axis

C. Rotate 180° about the origin

D. Reflect across the x-axis, then translate 2 units left

9. A triangle with an area of 12 square units is reflected and then translated. What is the area of the image?

10. Describe a sequence of two transformations that maps triangle A onto triangle B.



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Challenge

Multi-step and word problems that stretch it.

1. Triangle PQR is congruent to triangle STU, with P matching S, Q matching T and R matching U. PQ = 2x + 3, ST = 15, QR = y − 4 and TU = 10. What is x + y?

2. Mia says two triangles that both have angles of 50°, 60° and 70° must be congruent. What is wrong with her reasoning?

   A. The angles of a triangle can never be 50°, 60° and 70°.

   B. Congruent triangles must have different angles.

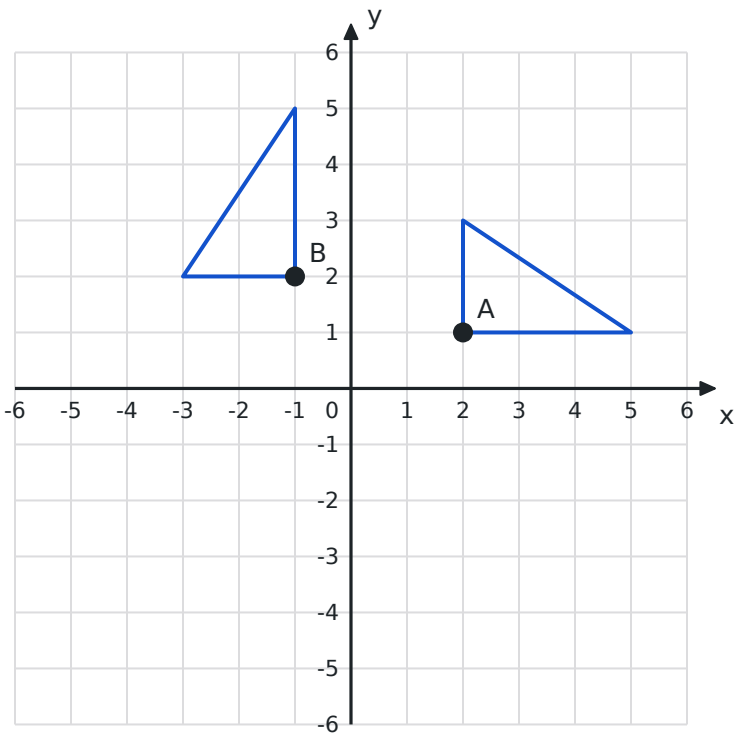
   C. Triangles with the same angles can be different sizes, so the sides may not match.

   D. Nothing; matching angles always means congruent.

3. The point (3, 1) is rotated 90° clockwise about the origin and then translated 2 units right. Where does it end up?

4. Explain why a figure and its image after any sequence of translations, reflections and rotations must be congruent.

5. Which transformation maps triangle A onto triangle B?



A. A rotation of 90° clockwise about the origin

B. A rotation of 90° counterclockwise about the origin

C. A reflection across the y-axis

D. A translation 3 units left and 1 unit up

6. A figure is reflected across the vertical line x = 2. Where does the point (5, 3) go?

7. Which single transformation has the same effect as reflecting across the x-axis and then across the y-axis?

A. A rotation of 180° about the origin

B. A rotation of 90° counterclockwise about the origin

C. A reflection across the line y = x

D. A translation

8. Quadrilateral WXYZ is congruent to quadrilateral ABCD, with the vertices matching in order. $\angle W = 80°$, $\angle X = 95°$ and $\angle Y = 110°$. What is $\angle D$?

9. A square and a rhombus both have sides of 4 cm. The rhombus has a 60° angle. Are they congruent? Explain.

10. A triangle with vertices (0, 0), (4, 0) and (0, 3) is mapped by a sequence of rigid motions onto a triangle with vertices (5, 5), (5, 1) and (2, 5). Which vertex of the image is the image of (0, 0)?