ALBERT

Name _____ Date _____

Similarity Transformations Worksheet

Geometry · Common Core HSG-SRT.A.2

> Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

Practice

Builds the skill step by step.

1. Two triangles are similar with a scale factor of 2 from the smaller to the larger. A side of the smaller triangle is 5. How long is the corresponding side of the larger?

2. Two figures are similar. An angle in one measures 47°. What does the corresponding angle in the other measure?

3. When are two figures similar?

   A. When they are both triangles

   B. When they have the same area

   C. When a sequence of rigid motions and dilations carries one onto the other

   D. When they have the same perimeter

4. A 2-by-3 rectangle and a 6-by-9 rectangle are similar. What is the scale factor from the smaller to the larger?

5. Are a 4-by-6 rectangle and a 6-by-8 rectangle similar?

   A. Yes, because both are rectangles.

   B. No, because their angles differ.

   C. Yes, because the sides increase by 2.

   D. No, because $6 \div 4 \neq 8 \div 6$.

6. $\triangle ABC \sim \triangle DEF$. $AB = 4$, $DE = 10$ and $BC = 6$. What is EF?

7. Two similar figures have a scale factor of $\frac{3}{2}$. The smaller figure has a perimeter of 20. What is the perimeter of the larger?

8. A triangle has angles of 40° and 60°. What is the third angle of any triangle similar to it?

9. Which pair of figures is always similar?

   A. two squares

   B. two rectangles

   C. two isosceles triangles

   D. two right triangles

10. $\triangle PQR \sim \triangle XYZ$ with a scale factor of $\frac{1}{3}$ from PQR to XYZ. $PQ = 12$. What is XY?

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On Level

Grade-level practice.

1. △ABC ~ △DEF. AB = 8, BC = 12, AC = 10 and DE = 6. What is the perimeter of △DEF?

2. Point (1, 3) is dilated by a scale factor of 2 with center at the origin and then translated by (x, y) → (x + 1, y − 2). What is the final image?

3. Which sequence maps the triangle with vertices (0, 0), (2, 0), (0, 1) onto the triangle with vertices (1, 1), (5, 1), (1, 3)?

   A. Reflect across the x-axis, then dilate by 2.

   B. Dilate by 2 about the origin, then translate by (x + 1, y + 1).

   C. Dilate by 4 about the origin.

   D. Translate by (x + 1, y + 1), then dilate by 2 about the origin.

4. Two similar triangles have sides 5, 7, 9 and 15, x, 27. What is x?

5. Two similar figures have a scale factor of 3. The smaller figure has an area of 4 square units. What is the area of the larger?

6. One triangle has angles 35°, 65° and 80°. Another has angles 35°, 80° and 65°. Are they similar?

   A. No, because the triangles are different sizes.

   B. Only if their sides are equal.

   C. No, because the angles are in a different order.

   D. Yes, because all corresponding angles are equal.

7. $\triangle ABC \sim \triangle DEF$. $AB = 12$ and $DE = 18$. What is the scale factor from $\triangle ABC$ to $\triangle DEF$?

8. $\triangle ABC \sim \triangle XYZ$. $m\angle A = 50°$ and $m\angle Y = 70°$. What is $m\angle Z$?

9. Are any two rhombuses similar?

   A. No, because rhombuses have no angles.

   B. Yes, because they are parallelograms.

   C. No. Their angles can be different even though each has equal sides.

   D. Yes, because all their sides are equal.

10. A 4-by-x rectangle is similar to a 10-by-15 rectangle, with the 4 matching the 10. What is x?

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Challenge

Multi-step and word problems that stretch it.

1. △ABC ~ △DEF. AB = x + 2, DE = 12, BC = x and EF = 9. What is x?

2. Two similar figures have areas of 50 and 200 square units. What is the scale factor from the smaller to the larger?

3. Explain, using transformations, why two triangles with all corresponding angles equal and all corresponding sides proportional are similar.

4. Two similar polygons have perimeters in the ratio 2 : 5. The smaller has a perimeter of 14. What is the perimeter of the larger?

5. Are any two circles similar?

   A. Only if they share a center.

   B. Yes. A translation and a dilation by the ratio of the radii carries one onto the other.

   C. No, unless their radii are equal.

   D. No, circles have no angles.

6. The triangle with vertices (0, 0), (4, 0) and (0, 3) is dilated by a scale factor of 2 about the origin and then reflected across the y-axis. Where does (4, 0) end up?

7. An 8-by-12 rectangle is similar to a rectangle whose longer side is 18. How long is the shorter side?

8. Which information is NOT enough to show two triangles are similar?

   A. one pair of congruent angles

   B. two pairs of congruent angles

   C. all three pairs of sides in the same ratio

   D. two pairs of sides in the same ratio with the included angles congruent

9. Two similar triangles have a scale factor of $\frac{5}{3}$ from the smaller to the larger. The longest side of the smaller triangle is 12. What is the longest side of the larger?

10. Two similar triangles have a scale factor of 2.5. An altitude of the smaller triangle is 6. What is the corresponding altitude of the larger?