

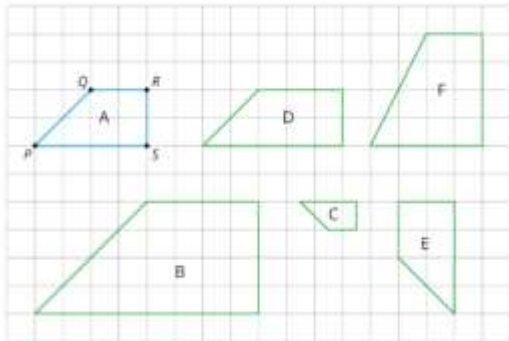
Unit 1 Study Guide

Transformations: Congruence & Similarity

1. Select **all** the true statements:

- a. Dilations always increase the length of line segments
- b. Dilations take perpendicular lines to perpendicular lines
- c. Dilations of an angle are congruent to the original angle
- d. Dilations increase the measure of angles
- e. Dilations of a triangle are congruent to the original triangle.
- f. Dilations of a triangle are similar to the original triangle.

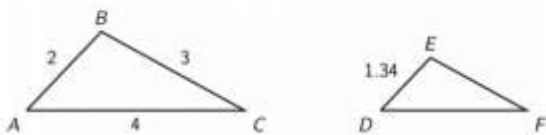
2. Here are some polygons.



a. Which of Polygons B, C, D, E, and F are similar to Polygon A?

b. Choose **ONE** of the polygons that are similar to Polygon A, and describe a sequence of transformations that take Polygon A to the selected polygon.

3. Triangles ABC and DEF are similar.

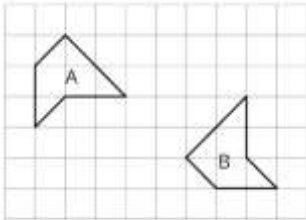


- a. Find the length of segment DF.
- b. Find the length of segment EF.

4. Select all the true statements.

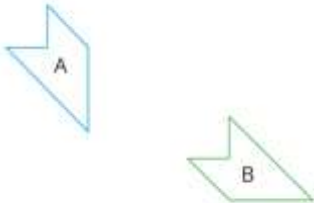
- A. Two squares with the same side lengths are always congruent
- B. Two rectangles with the same side lengths are always congruent
- C. Two rhombuses with the same side lengths are always congruent
- D. Two parallelograms with the same side lengths are always congruent

5. Show that Polygon A is congruent to Polygon B.

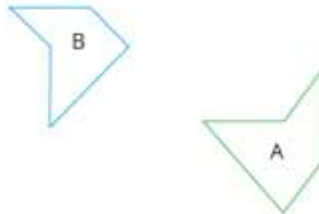


6. For each pair of shapes, decide whether Shape A is congruent to Shape B. Explain your reasoning.

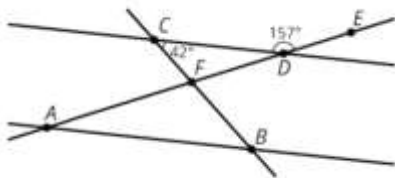
a. First pair



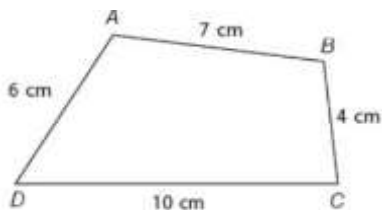
b. Second pair



7. Lines AB and CD are parallel. Find the measures of the three angles in triangle ABF

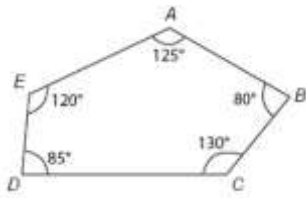


8. The following quadrilateral is translated 3 units left. Which of the side lengths below are correct for the translated image $A'B'C'D'$?



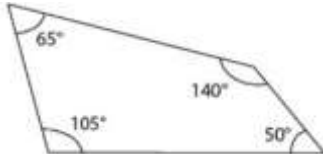
- a. $\overline{A'D'} = 4 \text{ cm}$
- b. $\overline{A'B'} = 7 \text{ cm}$
- c. $\overline{C'D'} = 6 \text{ cm}$
- d. $\overline{B'C'} = 10 \text{ cm}$

9. Which of the following measure of angles of the translated figure $A'B'C'D'E'$ is correct?

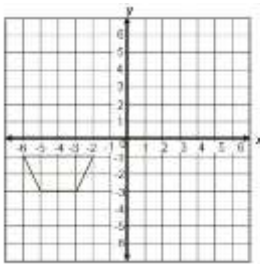


- A. $m\angle B' = 85^\circ$
- B. $m\angle C' = 130^\circ$
- C. $m\angle D' = 125^\circ$
- D. $m\angle E = 80^\circ$

10. Translate the quadrilateral right and down. What do you observe about the measure of angles?

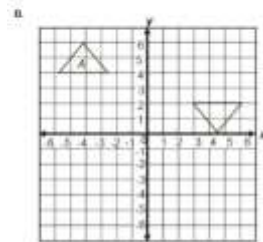
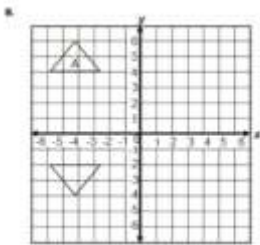
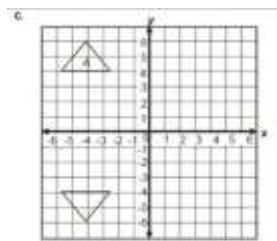
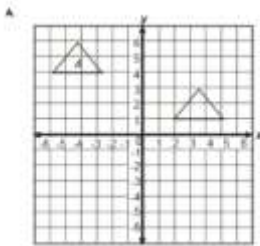


11. Look at the trapezoid below.



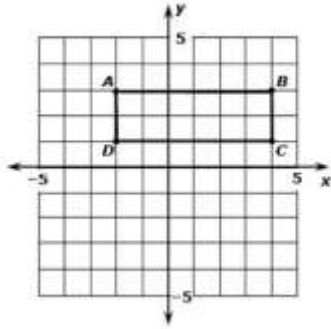
Draw the figure that is formed by a 180 degree rotation and then a reflection across the x-axis.

12. Which of the answers below show the translation of figure A by 2 units down and a reflection across the x-axis?



13. How many angles are needed to prove that two triangles are similar? Explain your answer.

14. Rectangle ABCD is shown on the coordinate plane.



Rectangle ABCD is rotated 90 degrees clockwise about the origin to produce Rectangle A'B'C'D'. What is the length, in units, of line segment C'D'?

Additional Questions to work on with your study group

7. The vertices of a quadrilateral are $W(1, 2)$, $X(1, 4)$, $Y(4, 4)$, and $Z(4, 2)$. Draw the figure and its image after a translation 3 units left and 2 units down.
8. The vertices of a triangle are $A(-1, -2)$, $B(-2, 2)$, and $C(-3, 0)$. Draw the figure and its image after a translation 5 units right and 1 unit up.

Draw the figure and its reflection in (a) the x -axis and (b) the y -axis.

11. $A(2, 0)$, $B(1, 5)$, $C(4, 3)$ 12. $D(-5, -5)$, $E(-5, -1)$, $F(-2, -2)$, $G(-2, -5)$
13. The vertices of a rectangle are $E(-1, 1)$, $F(-1, 3)$, $G(-5, 3)$, and $H(-5, 1)$. Find the coordinates of the figure after reflecting in the x -axis, and then translating 3 units right.

The vertices of a triangle are $A(-4, 2)$, $B(-2, 2)$, and $C(-3, 4)$. Rotate the triangle about the origin as described. Find the coordinates of the image.

16. 180° 17. 270° clockwise

Tell whether the two figures are similar. Explain your reasoning.

- 18.
- 19.

The figures are similar. Find x .

- 20.
- 21.

Dilations (k =scale factor)

The vertices of a figure are given. Draw the figure and its image after a dilation with the given scale factor. Identify the type of dilation.

27. $P(-3, -2), Q(-3, 0), R(0, 0); k = 4$

28. $B(3, 3), C(3, 6), D(6, 6), E(6, 3); k = \frac{1}{3}$

29. The vertices of a rectangle are $Q(-6, 2), R(6, 2), S(6, -4), T(-6, -4)$.

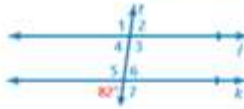
Dilate the rectangle with respect to the origin using a scale factor of $\frac{3}{2}$. Then translate it 5 units right and 1 unit down. What are the coordinates of the image?

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Use the figure to find the measure of the angle.

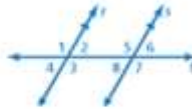
Explain your reasoning. (Section 3.1)

1. $\angle 2$ 2. $\angle 6$
3. $\angle 4$ 4. $\angle 1$



Complete the statement. Explain your reasoning. (Section 3.1)

5. If the measure of $\angle 1 = 123^\circ$, then the measure of $\angle 7 = \square$.
6. If the measure of $\angle 2 = 50^\circ$, then the measure of $\angle 5 = \square$.
7. If the measure of $\angle 5 = 119^\circ$, then the measure of $\angle 3 = \square$.
8. If the measure of $\angle 4 = 60^\circ$, then the measure of $\angle 6 = \square$.



Find the measures of the interior angles. (Section 3.2)

9. 10. 11.

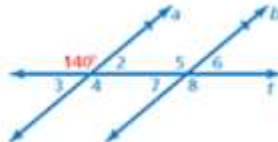
Find the measure of the exterior angle. (Section 3.2)

12. 13.

Use the figure to find the measure of the angle.

Explain your reasoning.

1. $\angle 8$ 2. $\angle 5$
3. $\angle 7$ 4. $\angle 2$



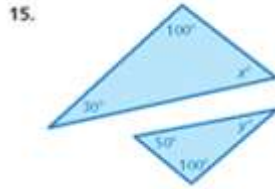
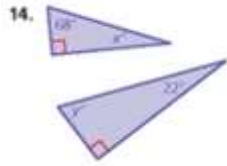
Find the measures of the interior angles.

5. 6.

Find the measure of the exterior angle.

7. 8.

Tell whether the triangles are similar. Explain.



For additional practice test questions, google the following math standards:

8.G.A.1

8.G.A.4

8.G.A.2

8.G.A.5

8.G.A.3

Answers:

1. B, C, F

2. a. Polygons B, C, and E

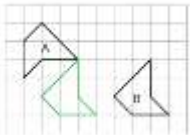
b. Answers vary. For B, dilate with center P and a scale factor of 2, then translate 6 squares down. For C, dilate using scale factor 0.5 and center S, and then reflect over line PS and translate 3 squares down and 7.5 squares to the right. For E, rotate 90 degrees counterclockwise around S, and then translate 2 squares down and 11 squares to the right.

3. a. 2.68 units (twice as long as segment DE)

b. 2.01 units (1.5 as long as segment DE)

4. A and B

5. Answers vary. Sample answer: If Polygon A is rotated 90 degrees counterclockwise around the point shown in the picture and then translated 4 units to the right, it matches up perfectly with Polygon B.



6. a. Congruent. If Shape A is reflected over its right side, then rotated 90 degrees counterclockwise around the lower vertex, it can be placed on top of Shape B with a translation down and to the right.

b. Not congruent. The shapes look congruent, but when Shape A is moved on top of Shape B with a 90-degree counterclockwise rotation and a translation, they do not match up.

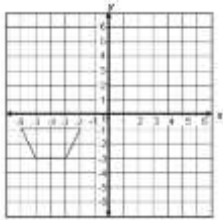
7. B=42, A=23, F=115

8. B

9. B

10. The angles stay congruent. They do not change at all during a translation.

11.

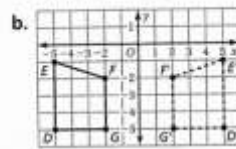
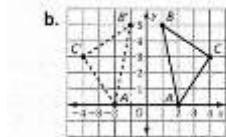
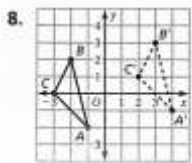
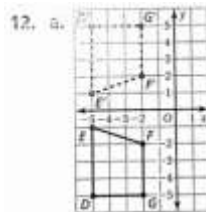
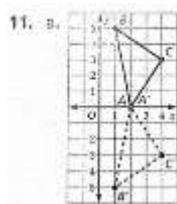
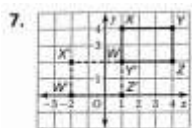


12. B

13. 2 angles are needed. Once you have 2 similar angles, that implies that the third angle is also the same. Two triangles with all congruent angles means the triangles are also similar (proportional)

14. 6 units

Additional Questions Answers



13. $E' (2, -1)$, $F' (2, -3)$, $G' (-2, -3)$, $H' (-2, -1)$

16. $A' (4, -2)$, $B' (2, -2)$, $C' (3, -4)$

17. $A' (-2, -4)$, $B' (-2, -2)$, $C' (-4, -3)$

18. No, the lengths of corresponding sides are not proportional

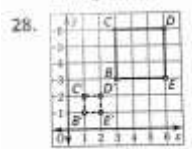
19. Yes, the lengths of corresponding sides are proportional and corresponding angles are congruent

20. 10 inches

21. 9 centimeters



enlargement



reduction

29. $Q'' (-4, 2)$, $R'' (14, 2)$, $S'' (14, -7)$, $T'' (-4, -7)$

1. 82 degrees because angle 2 and the given angle are alternate exterior angles
2. 82 degrees because angle 6 and the given angle are vertical angles
3. 82 degrees because angle 4 and the given angle are corresponding angles
4. 98 degrees because angle 4 and angle 1 are supplementary
5. 123 degrees because angle 1 and angle 7 are alternate exterior angles
6. 122 degrees because angle 2 and angle 8 are alternate interior angles and angle 8 and angle 5 are supplementary
7. 119 degrees because angle 5 and angle 3 are alternate interior angles
8. 60 degrees because angle 4 and angle 6 are alternate exterior angles
9. 60, 60, 60
10. 115, 40, 25
11. 45, 45, 90
12. 105
13. 60

1. 140 degrees because angle 8 and the given angle are alternate exterior angles
2. 140 degrees because angle 8 and angle 5 are vertical angles
3. 40 degrees because angle 8 and angle 7 are supplementary
4. 40 degrees because angle 2 and the given angle are supplementary
5. 41, 49, 90
6. 35, 35, 110
7. 125
8. 110
14. yes, the triangles have the same angle measurements of 90, 68, and 22
15. yes, the triangles have two pairs of congruent angles