Name: Key Date: _____ Class: _____

Homework: Transformations

1. Trapezoid OPQR is drawn on a coordinate grid where O(-1,2), P(1,2), Q(2,-1), and R(0,-3). Pedro draws its image, trapezoid O'P'Q'R, on the same coordinate grid using the rule $(x,y) \rightarrow (x+2, y-4)$. Describe the transformation that took place. What would the new coordinates be for O'P'Q'R'? Are the figures similar or congruent?

right 2 down 4

O' (1, -2)
P' (3, -2)
Q' (4, -5)
R' (2, -7)

Congruent (translation)

2. A quadrilateral has vertices at (-10,-2), (-8, 4), (2, 7), and (4,-9). Its image after a dilation has vertices at (-30, -6), (-24, 12), (6, 21), and (12, -27). What is the scale factor? Was the figure enlarged or reduced? Are the two figures similar or congruent?

Scale factor is 3. Since scale factor is >1, this would be an enlargement. Dilations lead to Similar figures.

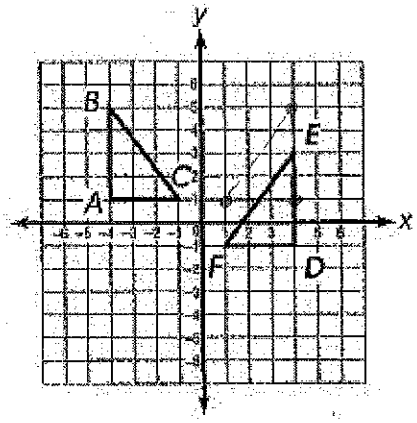
3. ΔABC was reflected across the y-axis and dilated to form its image $\Delta A'B'C'$. The length of $\overline{AB}$ is 3 units and the length of $\overline{A'B'}$ is 6 units. Which of the following statements about the triangles is true?

A. They are neither similar nor congruent.
B. They are both similar and congruent.
(C.) They are similar but not congruent.
D. They are congruent but not similar.

Dilations lead to similar figures. Congruent figures are the same size & shape. This figure was enlarged by a scale factor of 2.

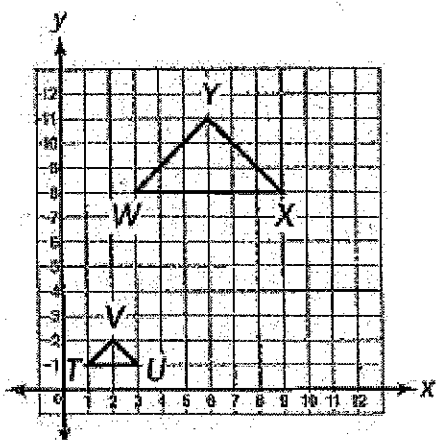
Describe the transformation or sequence of transformations that took place in each picture below. Be sure to use mathematical language and be as specific as possible. Tell whether the figures are congruent or similar.

4.



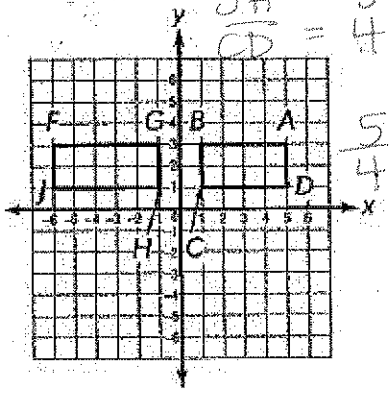
ΔABC was reflected over the y-axis & then translated -2 units vertically to form ΔDEF. The figures are congruent.

5.



The ΔTUV was dilated by a scale factor of 3 then translated vertically 5 units to form ΔWXY. The figures are similar.

6.

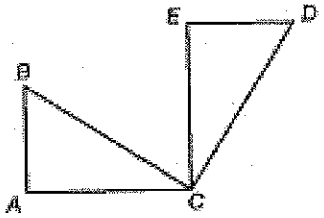


$\overline{GH} = 2$ units
$\overline{AD} = 2$ units
$\overline{JH} = 5$ units
$\overline{CD} = 4$ units

$\frac{5}{4} \neq \frac{2}{2}$

These figures do not fit any of our transformations. The size changed which would fit a dilation, but the side lengths are not proportional.

Triangle ABC is rotated 90° clockwise to create triangle EDC. Use this image to answer questions 7 and 8.

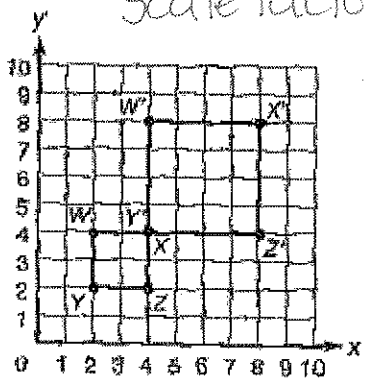


7. Which angle is congruent to ∠B?
   A. ∠BCE
   B. ∠ECD
   C. ∠E
   D. ∠D

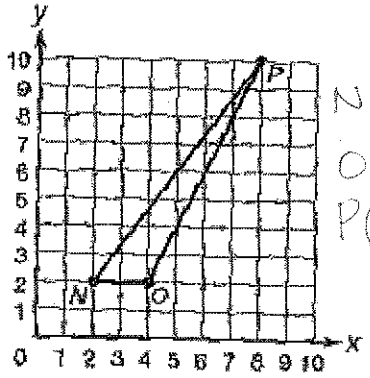
8. Which side is congruent to $\overline{AC}$?
   A. $\overline{BC}$
   B. $\overline{EC}$
   C. $\overline{ED}$
   D. $\overline{DC}$

9. Rectangle W'X'Y'Z' is the image of rectangle WXYZ after a dilation. What is the scale factor?

Scale factor = 2



10. ΔNOP was dilated using the following rule: $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$. What would be the new coordinates of the dilated image ΔN'O'P'?



N(2,2) → N'(1,1)
O(4,2) → O'(2,1)
P(8,10) → P'(4,5)

Big Picture: 11. Which transformations lead to congruent figures? Which lead to similar figures?

Translations, Reflections, & Rotations = congruent dilations = Similar

12. Is there any case in which a dilation can be made and the figures be congruent? Explain why or why not?

If the scale factor is 1, the size wouldn't change. Could be congruent.

13. What happens to the coordinates when you reflect an image over the y-axis? Over the x-axis?

reflect over y, keep y change sign x. reflect over x, keep x, change sign of y.

14. What would happen to the coordinates if you translated a figure 3 units vertically?

Vertical translations affect the y axis, so you would increase y by 3.

15. If a figure was translated -4 units horizontally and then reflected over the y-axis and then dilated by a scale factor 2, would the resulting figure be congruent or similar to the original figure? How do you know?

Similar - the dilation would change the size resulting in a similar figure.