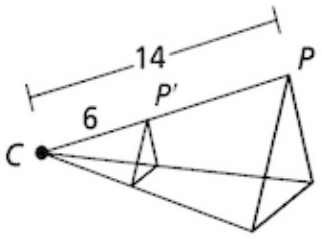
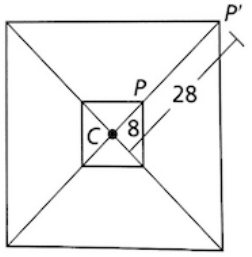
4-5-Dilations and Similarity Transformations – Homework

1) Find the scale factor of the dilation. Then tell whether the dilation is a *reduction* or *enlargement*.

a.



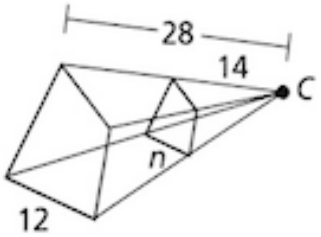
b.



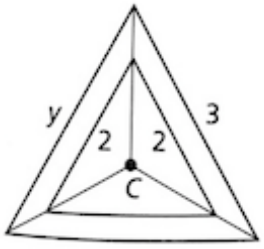
2) Graph the polygon and its image after a dilation with scale factor k.
   a. X(6, -1), Y(-2, -4), Z(1, 2); $k = 3$
   b. T(9, -3), U(6, 0), C(5, -5); $k = 2/3$
   c. R(-7, -1), S(2, 5), T(-2, -3), U(-3, -3); $k = -4$

3) Find the scale factor of the dilation and the value of the variable.

a. The small quadrilateral is the preimage

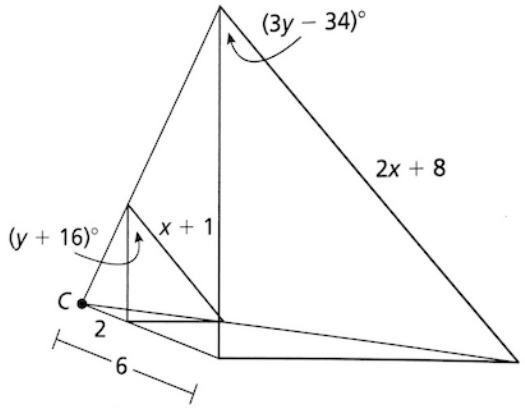


b. the inner triangle is the image.



4) Your friend prints a 4-inch by 6-inch photo for you from the school dance. All you have is an 8-inch by 10-inch frame. Can you dilate the photo to fit the frame? Explain your reasoning.

5) The larger triangle is a dilation of the smaller triangle. Find the values of x and y.



6) Explain why a scale factor of 2 is the same as 200%.

7) Dilate the line through $O(0, 0)$ and $A(1, 2)$ using a scale factor of 4.
   a. What do you notice about the length of $\overline{OA}$ and $\overline{O'A'}$?
   b. What do you notice about $\overleftrightarrow{OA}$ and $\overleftrightarrow{O'A'}$?
   c. Answer parts (b) and (c) again after dilating OA by a scale factor of 1/4
8) Your friend claims that dilating a figure by 1 is the same as dilating a figure by -1 because the original figure will not be enlarged or reduced. Is your friend correct? Explain.
9) Rectangle *WXYZ* has vertices *W(-3, -1), X(-3, 3), Y(5, 3),* and *Z(5, -1)*.
   a. Find the perimeter and area of the triangle
   b. Dilate the rectangle using a scale factor of 3. Find the perimeter and area of the dilated rectangle. What do you notice?
   c. Repeat part (b) using a scale factor of ¼
   d. Make a conjecture for how the perimeter and area change when a figure is dilated.
10) Graph ΔFGH with vertices *F*(-2, 2), *G*(-2, -4), and *H*(-4, -4) and its image after the similarity transformation

   a. Dilation: $(x,y)\rightarrow\left(\frac{1}{2}x,\frac{1}{2}y\right)$
   Reflection: in the y-axis

   b. Rotation: 90° counterclockwise about the origin
   Dilation: $(x,y)\rightarrow(3x,3y)$

11) Determine if GHI is similar to JKL where G(-2, 3), H(4, 3), I(4, 0), and J(1, 0), K(6, -2), L(1, -2)
12) Quadrilateral *JKLM* is mapped to quadrilateral *J'K'L'M'* using the dilation $(x,y)\rightarrow\left(\frac{3}{2}x,\frac{3}{2}y\right)$. Then quadrilateral *J'K'L'M'* is mapped to quadrilateral *J''K''L''M''* using the translation $(x,y)\rightarrow(x+3,y-4)$. The vertices of *J'K'L'M'* are J'(-12, 0), K'(-12, 18), L'(-6, 18) and M'(-6, 0). Find the coordinates of *J''K''L''M''* and *JKLM*. Are quadrilateral *JKLM* and *J''K''L''M''* similar? Explain.