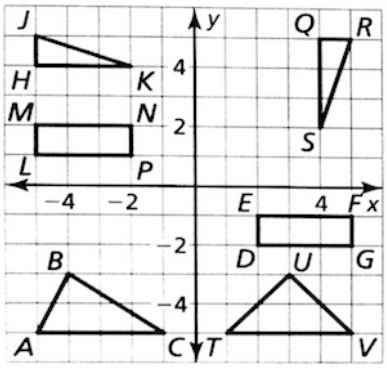
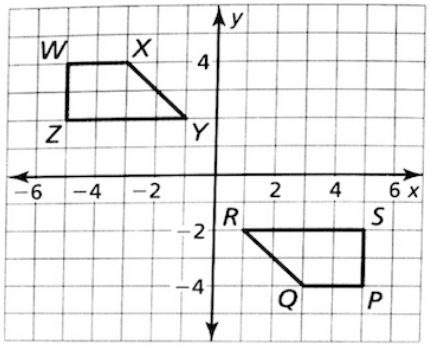
4-4-Congruence and Transformations – Homework

1) Identify any congruent figures in the coordinate plane. Explain.

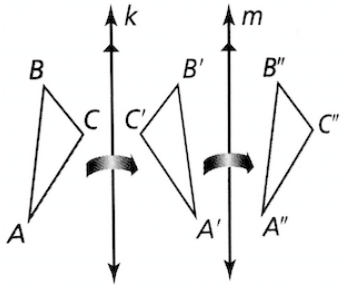


2) Describe a congruence transformation that maps WXYZ onto PQRS.

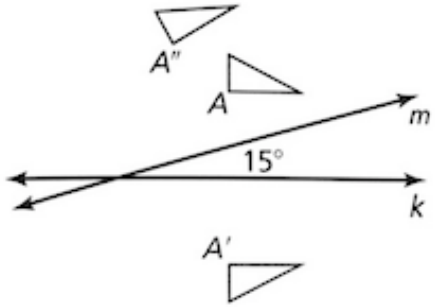


3) Determine whether the polygons with the given vertices are congruent. Use transformations to explain your reasoning.
   a. Q(2, 4), R(5, 4), S(4, 1) and T(6, 4), U(9, 4), V(8, 1)
   b. W(-3, 1), X(2, 1), Y(4, -4), Z(-5, -4) and C(-1, -3), D(-1, 2), E(4, 4), F(4, -5)
   c. J(1, 1), K(3, 2), L(4, 1) and M(6, 1), N(5, 2), P(2, 1)

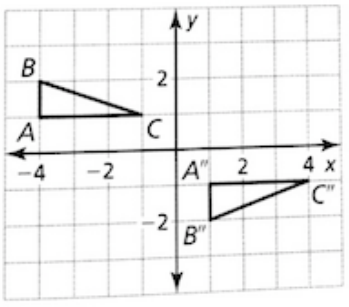
4) $k \parallel m$, ΔABC is reflected in line k and $\Delta A'B'C'$ is reflected in line m.
   a. A translation maps ΔABC onto which triangle?
   b. Which lines are perpendicular to $\overline{AA''}$?
   c. If the distance between k and m is 2.6 inches, what is the length of $\overline{CC''}$?
   d. Is the distance from B' to m the same as the distance from B'' to m? Explain.



5) Find the angle of rotation that maps A onto A''.



6) Describe and correct the error in describing the congruence transformation.



$\triangle ABC$ is mapped to $\triangle A''B''C''$ by a translation 3 units down and a reflection in the y-axis.

7) Find the measure of the acute or right angle formed by intersecting lines so that *C* can be mapped to *C'* using two reflections.

   a. A rotation of 84° maps *C* to *C'*

   b. The rotation $(x,y)\rightarrow(-x,-y)$ maps *C* to *C'*

8) Tell whether the statement is *always, sometimes*, or *never* true. Explain your reasoning.

   a. A congruence transformation changes the size of a figure.

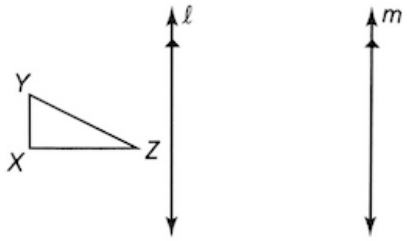
   b. If two figures are congruent, then there is a rigid motion or a composition of rigid motions that maps one figure onto the other.

   c. The composition of two reflections results in the same image as a rotation.

   d. A translation results in the same image as the composition of two reflections.

9) $\overline{PQ}$, with endpoints *P(1, 3)* and *Q(3, 2)*, is reflected in the y-axis. The image $\overline{P'Q'}$ is then reflected in the x-axis to produce the image $\overline{P''Q''}$. One classmate says that $\overline{PQ}$ is mapped to $\overline{P''Q''}$ by the translation $(x,y)\rightarrow(x-4,y-5)$. Another classmate says that $\overline{PQ}$ is mapped to $\overline{P''Q''}$ by a 180° rotation about the origin. Which classmate is correct? Explain your reasoning.

10) Does the order of reflections for a composition of two reflections in parallel lines matter? For example, is reflecting ΔXYZ in the line *l* and then its image in the line *m* the same as reflecting ΔXYZ in the line *m* and then in the line *l*?



11) Given: A reflection in line *l* maps $\overline{JK}$ to $\overline{J'K'}$, a reflection in line *m* maps $\overline{J'K'}$ to $\overline{J''K''}$, and $l \parallel m$

Prove: $KK'' = 2d$ where *d* is the distance between *l* and *m*.