BECA / Dr. Huson / Geometry   1
Unit 8: Congruence transformations   Name: Solutions
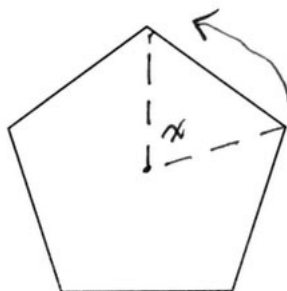6 February 2023

7.7 Classwork: "Onto" mappings, symmetry

1. What is the smallest non-zero angle of rotation about its center that would map the pentagon onto itself?
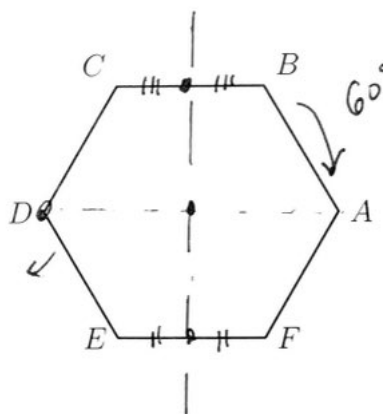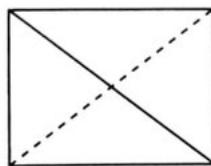
$$5x = 360$$
$$x = 72°$$

2. Circle YES or NO to indicate whether the given transformation maps the hexagon onto itself.

   (a) Yes   No   A reflection over $\overleftrightarrow{AD}$

   (b) Yes   No   A rotation of 60° clockwise around the hexagon's center.

   (c) Yes   No   A reflection over a line through the midpoints of $\overline{BC}$, $\overline{EF}$.

   (d) Yes   No   A rotation of 120° counterclockwise around point D.

3. The figure shows a rectangle (not a square).

   Which transformations carries the rectangle onto itself? Mark each True or False.

   (a) A reflection over the solid diagonal   True   False

   (b) A reflection over the dashed diagonal   True   False

   (c) A clockwise rotation of 90° about the intersection of the diagonals   True   False

   (d) A clockwise rotation of 180° about the intersection of the diagonals   True   False

4. A transformation maps $\triangle ABC \rightarrow \triangle DEC$, shown below.

(a) Fully specify the transformation.

Counterclockwise rotation 90° around point C

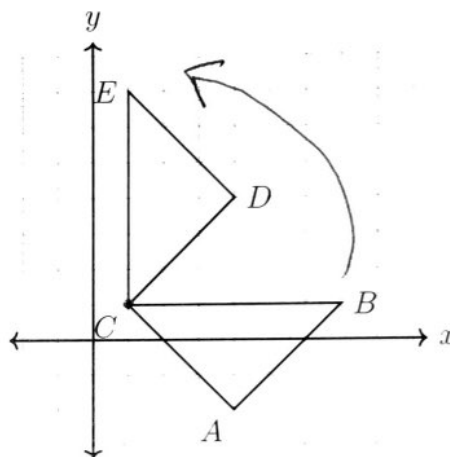(b) Identify each corresponding object.

i. $A \rightarrow$ _D_

ii. $B \rightarrow$ _E_

iii. $C \rightarrow$ _C_

iv. $\angle ACB \cong \angle DCE$

v. _AB_ $\cong \overline{DE}$

5. Check those transformations that are rigid motions.

☐ Dilation   ☑ Rotation
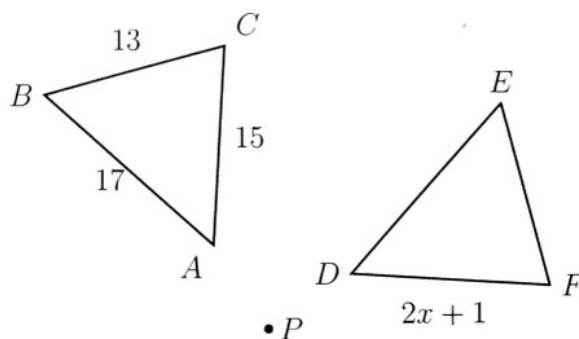
☑ Translation   ☑ An isometry

☑ Reflection   ☐ Horizontal stretch

6. In the diagram below, $\triangle ABC$ with sides of 13, 15, and 17, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P.

(a) What is A mapped to? $A \rightarrow$ D

(b) What corresponds to F? C

(c) Given $DF = 2x + 1$. Find x.

$$2x + 1 = 15$$
$$x = 7$$

7. Reflect $\triangle TRS$ across the y-axis, labeling the image $\triangle T'R'S'$. Check those properties that are maintained by reflection.
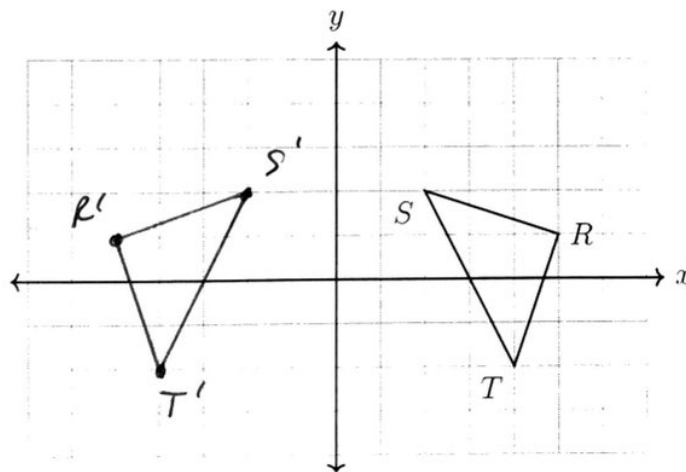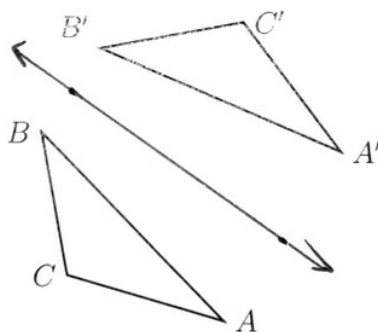
☑ Length

☑ Angle measures
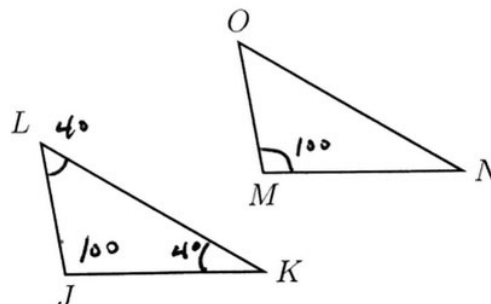
☐ Orientation

☑ Parallel relationships

☑ Area

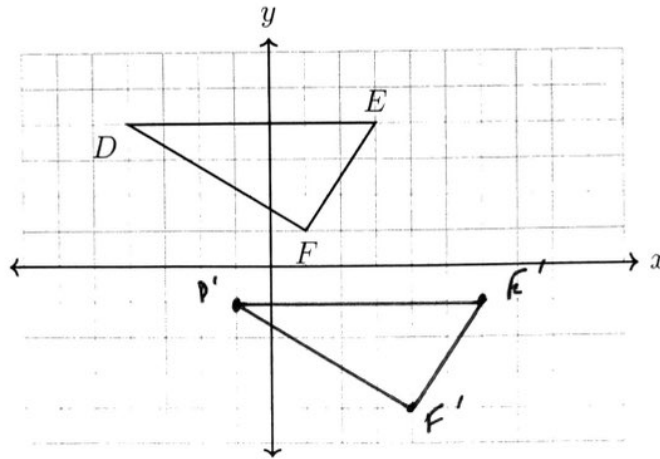8. Draw the line of reflection that would map $\triangle ABC$ onto $\triangle A'B'C'$.

9. An isometry maps $\triangle JKL \to \triangle MNO$. $m\angle K = 40°$ and $m\angle M = 100°$.
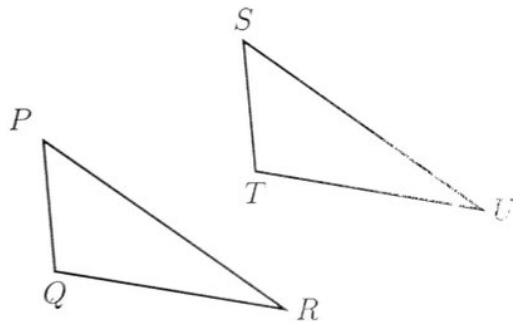
   Find the measure of $\angle L$.

$$m\angle L = 40°$$

10. Translate $\triangle DEF$ by $(x, y) \rightarrow (x + 3, y - 5)$. Label the image $\triangle D'E'F'$.

11. A translation maps triangle PQR onto triangle STU.

Write each corresponding object.

(a) $Q \rightarrow$ ___T___

(b) $\angle QRP \cong \angle US$

(c) ___PQ___ $\cong \overline{ST}$

(d) Justify $\triangle PQR \cong \triangle STU$. Use the words "rigid motion".

Translation is a rigid motion that maintains length. The triangles are congruent (SSS)

12. Translate $\triangle XYZ$ with $X(-1, 2)$, $Y(3, 4)$, $Z(1, -3)$ by $(x, y) \rightarrow (x - 6, y - 1)$, labeling the image $\triangle X'Y'Z'$.