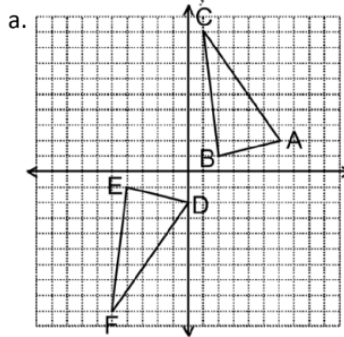


## Congruence and Parallel Line Properties Test Review

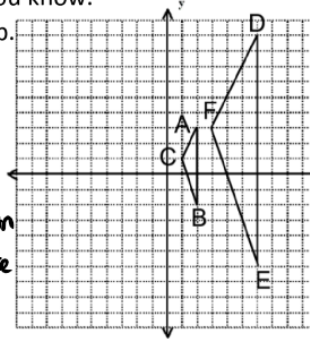
1. Explain why rigid motions create congruent figures.

Rigid motions preserve side lengths and angle measures and congruent figures are figures with equal side lengths and angle measures.

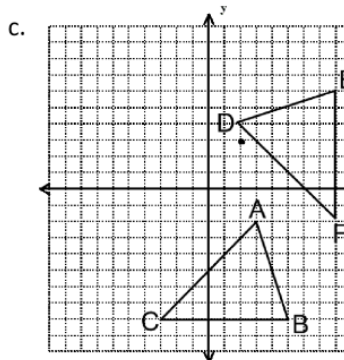
2. For each of figures state if they are congruent and explain how you know.



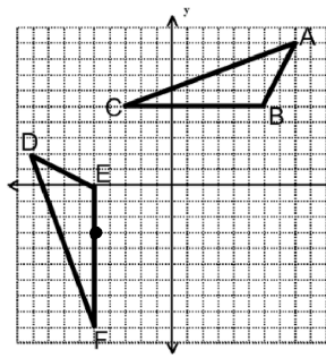
$\triangle ABC$  can be mapped onto  $\triangle DEF$  by a reflection over the x-axis then translation of  $(x, y) \rightarrow (x-6, y)$ . A reflection then translation is a sequence of rigid motions. Rigid motions create congruent figures. Thus  $\triangle ABC \cong \triangle DEF$



$\triangle ABC$  can be mapped onto  $\triangle DEF$  by a dilation with scale factor of 3. A dilation is not a rigid motion. Only rigid motions create congruent figures. Thus  $\triangle ABC \not\cong \triangle DEF$ .



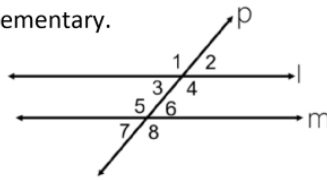
$\triangle ABC$  can be mapped onto  $\triangle DEF$  by a rotation of  $90^\circ$  ccw then a translation of  $(x, y) \rightarrow (x, y+1)$ . A rotation then translation is a sequence of rigid motions. Rigid motions create congruent figures. Thus,  $\triangle ABC \cong \triangle DEF$



$\triangle ABC$  can be mapped onto  $\triangle DEF$  by a rotation of  $90^\circ$  ccw then a translation  $(x, y) \rightarrow (x, y-6)$ . A rotation then translation is a sequence of rigid motions. Rigid motions create congruent figures. Thus  $\triangle ABC \cong \triangle DEF$ .

3. Given that  $l \parallel m$ , prove  $\angle 4$  and  $\angle 6$  are supplementary.

Statement	Reason
$l \parallel m$	Given
$\angle 4 \cong \angle 8$	corr. $\angle$ 's Post.
$m\angle 4 = m\angle 8$	Definition of Congruence
$\angle 8$ and $\angle 6$ are linear pairs	Definition of linear pairs
$m\angle 8 + m\angle 6 = 180^\circ$	Linear pairs conjecture
$m\angle 4 + m\angle 6 = 180^\circ$	Substitution
$\angle 4$ and $\angle 6$ are supplementary	Def. of Supp.

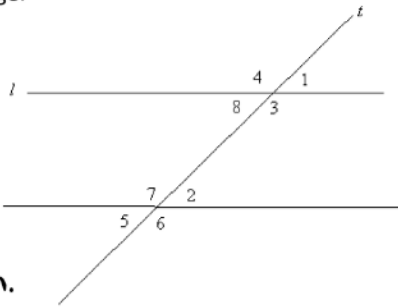


4. Given that  $l \parallel m$ , prove  $\angle 4 \cong \angle 5$

Statement	Reason
$l \parallel m$	Given
$\angle 4 \cong \angle 8$	corr. $\angle$ 's Post
$\angle 8 \cong \angle 5$	Vertical $\angle$ 's
$\angle 4 \cong \angle 5$	Transitive Prop.

Prove the following using the given image.

5. Given that lines  $l$  and  $m$  are parallel  
 Prove: angle 8 is congruent to angle 2



Statement	Reason
$l \parallel m$	Given
$\angle 8 \cong \angle 5$	Corr. $\angle$ 's Post.
$\angle 5 \cong \angle 2$	Vertical $\angle$ 's Thm.
$\angle 8 \cong \angle 2$	Transitive Prop.

6. Given that lines  $l$  and  $m$  are parallel  
 Prove: angle 4 and 5 are supplementary

Statement	Reason
$l \parallel m$	Given
$\angle 4 \cong \angle 7$	Corr. $\angle$ 's Post
$m\angle 4 = m\angle 7$	Def. of congruence
$\angle 7$ and $\angle 5$ are linear Pairs	Def. of Linear Pairs
$m\angle 7 + m\angle 5 = 180^\circ$	Linear Pairs Conjecture
$m\angle 4 + m\angle 5 = 180^\circ$	Substitution
$\angle 4$ and $\angle 5$ are Supplementary	Def. of Supp.

Determine the relationship for each pair of angles. Use that relationship to solve for  $x$ .

1) Alt. Int.  
 $21x - 4 = 80$   
 $21x = 84$   
 $x = 4$

2) Same Side Int.  
 $x + 58 + 130 = 180$   
 $x + 188 = 180$   
 $x = -8$

3) Alt. Ext.  
 $x + 87 = 82$   
 $x = -5$

4) Corresponding.  
 $10x + 14 = 12x - 2$   
 $-2x = -16$   
 $x = 8$

5) Same Side Int.  
 $26x - 2 + 52 = 180$   
 $26x + 50 = 180$   
 $26x = 130$   
 $x = 5$

6) Alt. Ext.  
 $21x - 6 = 120$   
 $21x = 126$   
 $x = 6$