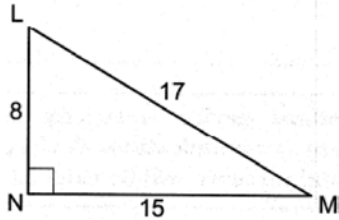


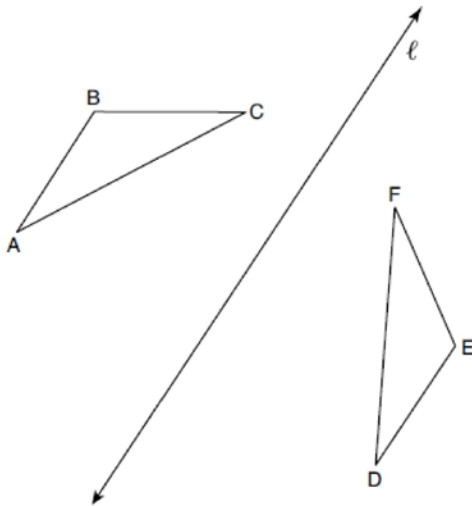
G.CO.B.6: Properties of Transformations 1

- 1 In right triangle LMN below, $LN = 8$, $MN = 15$, and $LM = 17$.



If triangle LMN is translated such that it maps onto triangle XYZ , which statement is always true?

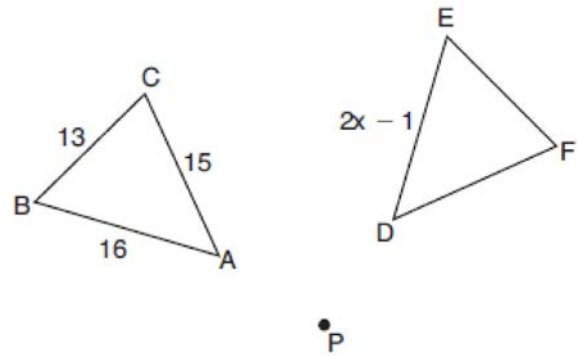
- 1) $XY = 15$
 - 2) $YZ = 17$
 - 3) $m\angle Z = 90^\circ$
 - 4) $m\angle X = 90^\circ$
- 2 In the diagram below, $\triangle ABC$ is reflected over line ℓ to create $\triangle DEF$.



If $m\angle A = 40^\circ$ and $m\angle B = 95^\circ$, what is $m\angle F$?

- 1) 40°
- 2) 45°
- 3) 85°
- 4) 95°

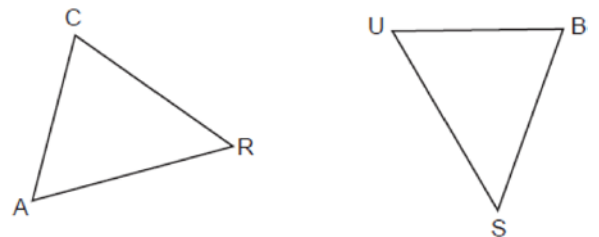
- 3 In the diagram below, $\triangle ABC$ with sides 13, 15, and 16, is mapped onto $\triangle DEF$ after a clockwise rotation of 90° about point P .



If $DE = 2x - 1$, what is the value of x ?

- 1) 7
- 2) 7.5
- 3) 8
- 4) 8.5

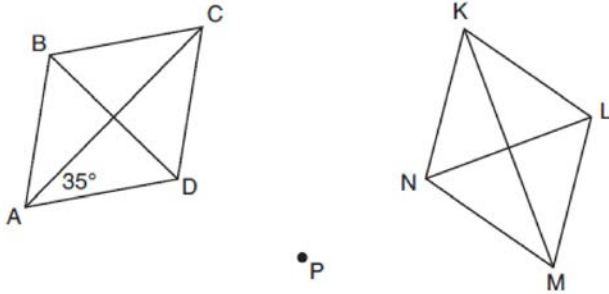
- 4 In the diagram below, $\triangle CAR$ is mapped onto $\triangle BUS$ after a sequence of rigid motions.



If $AR = 3x + 4$, $RC = 5x - 10$, $CA = 2x + 6$, and $SB = 4x - 4$, what is the length of SB ?

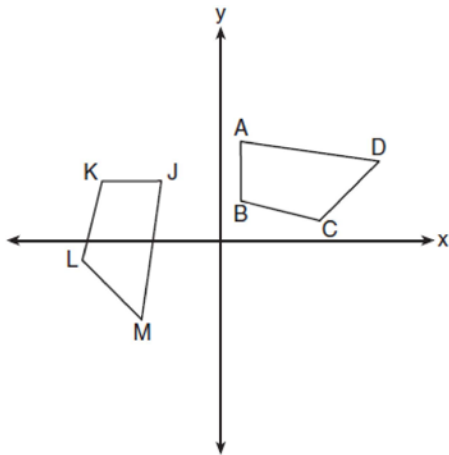
- 1) 6
- 2) 16
- 3) 20
- 4) 28

- 5 Rhombus $ABCD$ can be mapped onto rhombus $KLMN$ by a rotation about point P , as shown below.



What is the measure of $\angle KNM$ if the measure of $\angle CAD = 35^\circ$?

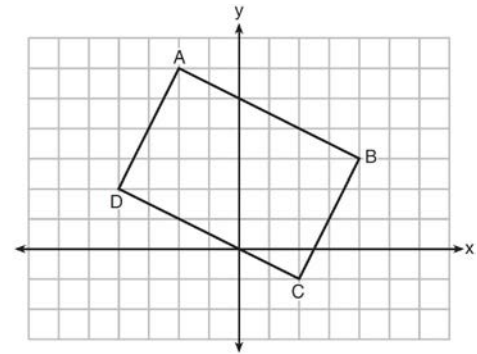
- 1) 35°
 - 2) 55°
 - 3) 70°
 - 4) 110°
- 6 In the diagram below, a sequence of rigid motions maps $ABCD$ onto $JKLM$.



If $m\angle A = 82^\circ$, $m\angle B = 104^\circ$, and $m\angle L = 121^\circ$, the measure of $\angle M$ is

- 1) 53°
- 2) 82°
- 3) 104°
- 4) 121°

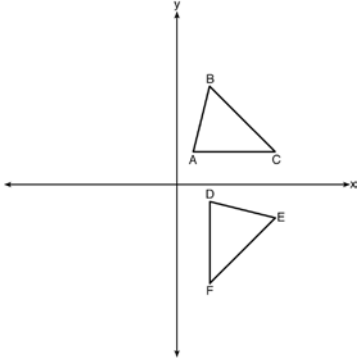
- 7 Quadrilateral $ABCD$ is graphed on the set of axes below.



When $ABCD$ is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral $A'B'C'D'$. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?

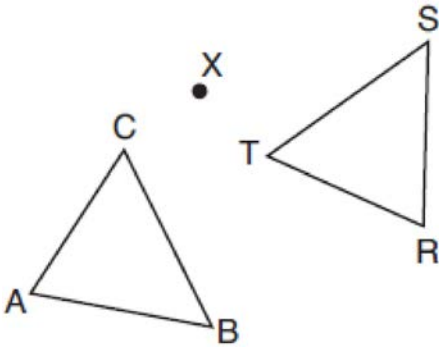
- 1) no and $C'(1,2)$
- 2) no and $D'(2,4)$
- 3) yes and $A'(6,2)$
- 4) yes and $B'(-3,4)$

- 8 The image of $\triangle ABC$ after a rotation of 90° clockwise about the origin is $\triangle DEF$, as shown below.



Which statement is true?

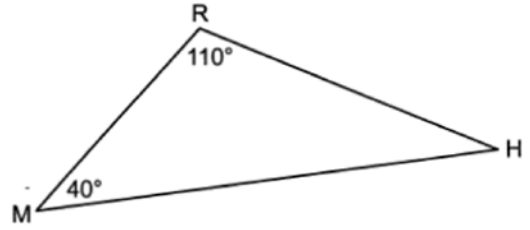
- 1) $\overline{BC} \cong \overline{DE}$
 - 2) $\overline{AB} \cong \overline{DF}$
 - 3) $\angle C \cong \angle E$
 - 4) $\angle A \cong \angle D$
- 9 After a counterclockwise rotation about point X , scalene triangle ABC maps onto $\triangle RST$, as shown in the diagram below.



Which statement must be true?

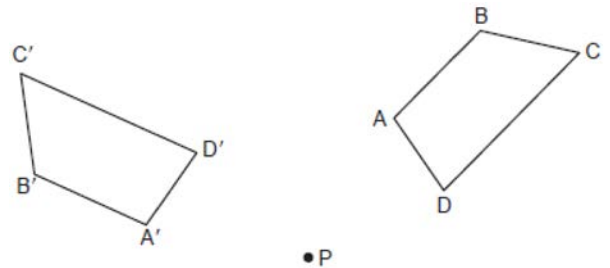
- 1) $\angle A \cong \angle R$
- 2) $\angle A \cong \angle S$
- 3) $\overline{CB} \cong \overline{TR}$
- 4) $\overline{CA} \cong \overline{TS}$

- 10 In $\triangle RHM$ below, $m\angle R = 110^\circ$ and $m\angle M = 40^\circ$.



If $\triangle RHM$ is reflected over side \overline{HM} to form quadrilateral $RHR'M$, which statement is always true?

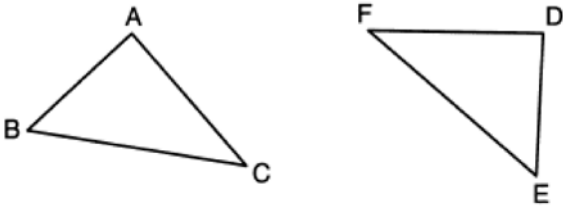
- 1) Quadrilateral $RHR'M$ is a parallelogram.
 - 2) $m\angle MHR' = 40^\circ$
 - 3) $m\angle HMR' = 40^\circ$
 - 4) $\overline{MR} \cong \overline{HR'}$
- 11 Trapezoid $ABCD$ is drawn such that $\overline{AB} \parallel \overline{DC}$. Trapezoid $A'B'C'D'$ is the image of trapezoid $ABCD$ after a rotation of 110° counterclockwise about point P .



Which statement is always true?

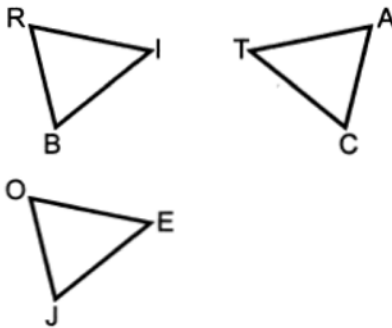
- 1) $\angle A \cong \angle D'$
- 2) $\overline{AC} \cong \overline{B'D'}$
- 3) $\overline{A'B'} \parallel \overline{D'C'}$
- 4) $\overline{B'A'} \cong \overline{C'D'}$

- 12 In the diagram below, a line reflection followed by a rotation maps $\triangle ABC$ onto $\triangle DEF$.



Which statement is always true?

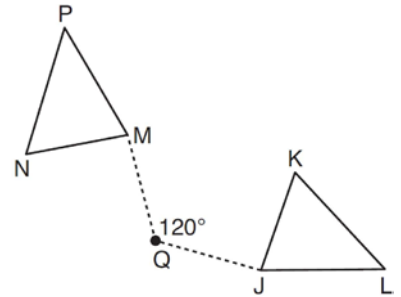
- 1) $\overline{BC} \cong \overline{EF}$
 - 2) $\overline{AC} \cong \overline{DE}$
 - 3) $\angle A \cong \angle F$
 - 4) $\angle B \cong \angle D$
- 13 In the diagram below, $\triangle BRI$ is the image of $\triangle JOE$ after a translation. Triangle CAT is the image of $\triangle BRI$ after a line reflection.



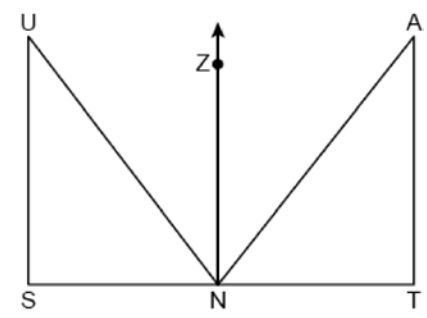
Which statement is always true?

- 1) $\angle R \cong \angle T$
- 2) $\angle J \cong \angle A$
- 3) $\overline{JE} \cong \overline{RI}$
- 4) $\overline{OE} \cong \overline{AT}$

- 14 Triangle MNP is the image of triangle JKL after a 120° counterclockwise rotation about point Q . If the measure of angle L is 47° and the measure of angle N is 57° , determine the measure of angle M . Explain how you arrived at your answer.

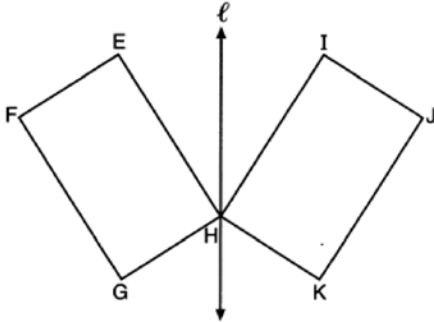


- 15 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over \overline{NZ} .



Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

- 16 In the diagram below, parallelogram $EFGH$ is mapped onto parallelogram $IJKH$ after a reflection over line ℓ .



Use the properties of rigid motions to explain why parallelogram $EFGH$ is congruent to parallelogram $IJKH$.

- 17 If $\triangle ABC$ is mapped onto $\triangle DEF$ after a line reflection and $\triangle DEF$ is mapped onto $\triangle XYZ$ after a translation, the relationship between $\triangle ABC$ and $\triangle XYZ$ is that they are always
- 1) congruent and similar
 - 2) congruent but not similar
 - 3) similar but not congruent
 - 4) neither similar nor congruent
- 18 Quadrilateral $MATH$ is congruent to quadrilateral $WXYZ$. Which statement is always true?
- 1) $MA = XY$
 - 2) $m\angle H = m\angle W$
 - 3) Quadrilateral $WXYZ$ can be mapped onto quadrilateral $MATH$ using a sequence of rigid motions.
 - 4) Quadrilateral $MATH$ and quadrilateral $WXYZ$ are the same shape, but not necessarily the same size.
- 19 Triangle $A'B'C'$ is the image of triangle ABC after a translation of 2 units to the right and 3 units up. Is triangle ABC congruent to triangle $A'B'C'$? Explain why.

G.CO.B.6: Properties of Transformations 1

Answer Section

1 ANS: 3

The measures of the angles of a triangle remain the same after a translation because translations are rigid motions which preserve angle measure.

REF: 082401geo

2 ANS: 2

$$180 - 40 - 95 = 45$$

REF: 082201geo

3 ANS: 4

$$2x - 1 = 16$$

$$x = 8.5$$

REF: 011902geo

4 ANS: 3

$$5x - 10 = 4x - 4 \quad 4(6) - 4 = 20$$

$$x = 6$$

REF: 012408geo

5 ANS: 4

$$90 - 35 = 55 \quad 55 \times 2 = 110$$

REF: 012015geo

6 ANS: 1

$$360 - (82 + 104 + 121) = 53$$

REF: 011801geo

7 ANS: 4 REF: 011611geo

8 ANS: 4

The measures of the angles of a triangle remain the same after all rotations because rotations are rigid motions which preserve angle measure.

REF: fall1402geo

9 ANS: 1 REF: 061801geo

10 ANS: 3 REF: 062407geo

11 ANS: 3 REF: 062302geo

12 ANS: 1

The lengths of the sides of a triangle remain the same after all rotations and reflections because rotations and reflections are rigid motions which preserve distance.

REF: 012301geo

13 ANS: 4 REF: 062401geo

- 14 ANS:
 $M = 180 - (47 + 57) = 76$ Rotations do not change angle measurements.
REF: 081629geo
- 15 ANS:
Reflections preserve distance, so the corresponding sides are congruent.
REF: 082430geo
- 16 ANS:
Reflections preserve distance and angle measure.
REF: 062228geo
- 17 ANS: 1
Distance and angle measure are preserved after a reflection and translation.
REF: 081802geo
- 18 ANS: 3 REF: 082203geo
- 19 ANS:
Yes, as translations do not change angle measurements.
REF: 061825geo