Geometry 4.7

Identify reflections, translations, and rotations

Verify congruence after a congruence transformation

preimage

image

isometry:
- reflection — flip (line) reverses
- translation — slide
- rotation — turn (center) CCW

congruence transformation (isometry)

dilation — size SF > 1 enlarge, SF < 1 reduction (SF = 1 ≅)

activity: letters,

~~Desmos polygraph (if time) transformations~~

Quiz Wed. 4.5-4.6

Reverses orientation

KeyConcept Reflections, Translations, and Rotations

A **reflection** or *flip* is a transformation over a line called the *line of reflection.* Each point of the preimage and its image are the same distance from the line of reflection.

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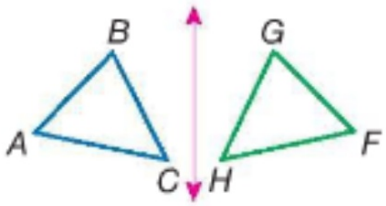
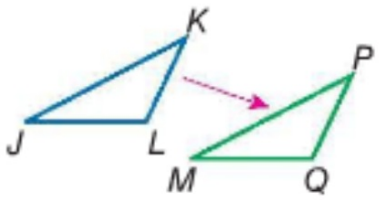
Example



$\triangle ABC \longrightarrow \triangle FGH$

A **translation** or *slide* is a transformation that moves all points of the original figure the same distance in the same direction.

Example

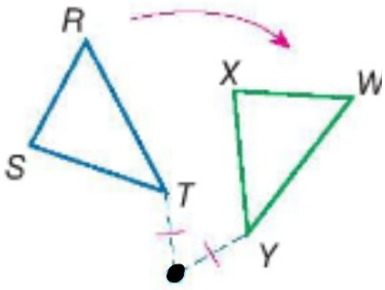


$\triangle JKL \longrightarrow \triangle MPQ$

A **rotation** or *turn* is a transformation around a fixed point called the *center of rotation*, through a specific angle, and in a specific direction. Each point of the original figure and its image are the same distance from the center.

CCW

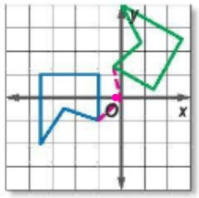
Example

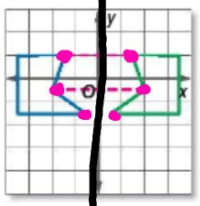


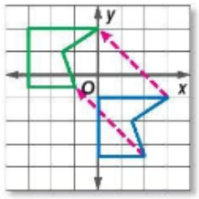
$\triangle RST \longrightarrow \triangle WXY$

Example 1 Identify Congruence Transformations

Identify the type of congruence transformation shown as a *reflection, translation,* or *rotation.*

a. 

b. 

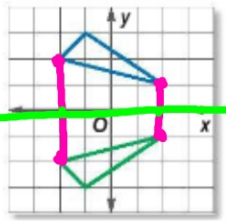
c. 

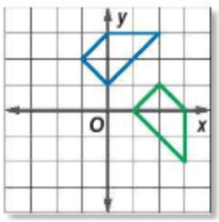
+ up 3 left 3

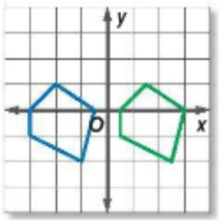
rotation around origin

refl. y-axis

Guided Practice

1A. 

1B. 

1C. 

Refl. x-axis

Rot. around origin 90°

T 3.5 horiz

GuidedPractice

Identify the type of congruence transformation shown as a *reflection, translation,* or *rotation.*

2A.

2B.

2 Verify Congruence You can verify that reflections, translations, and rotations of triangles produce congruent triangles using SSS.

Example 3 Verify Congruence after a Transformation

Triangle XZY with vertices $X(2, -8)$, $Z(6, -7)$, and $Y(4, -2)$ is a transformation of $\triangle ABC$ with vertices $A(2, 8)$, $B(6, 7)$, and $C(4, 2)$. Graph the original figure and its image. Identify the transformation and verify that it is a congruence transformation.

refl. x-axis

Identify: eyeball
To verify: do the math...could use SSS, SAS, etc.
You have to PROVE it!

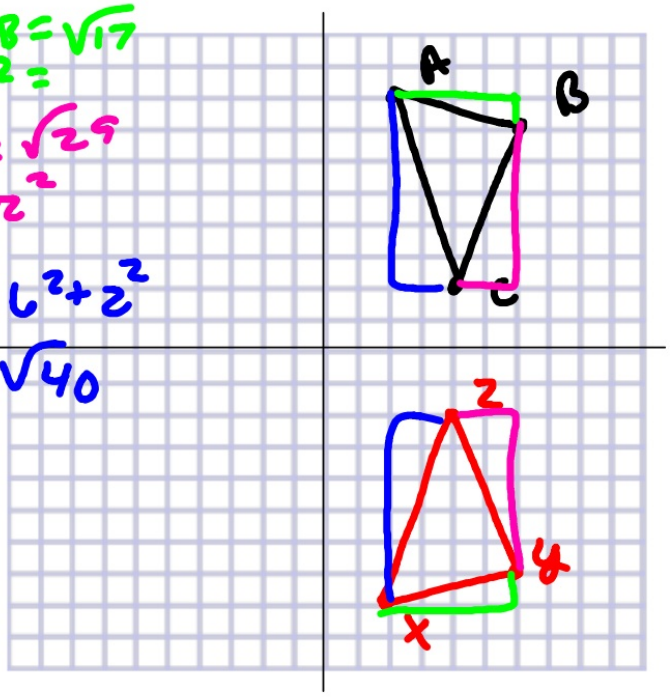
ASA AAS

pre

X (2, -8) A (2, 8)
Z (6, -7) B (6, 7)
Y (4, -2) C (4, 2)

$AB = \sqrt{17}$
$4^2 + 1^2 =$
$BC = \sqrt{25}$
$5^2 + 2^2$
$AC = 6^2 + 2^2$
$= \sqrt{40}$

$AB = xy$
$BC = zy$
$AC = xz$
} by SSS



Whiteboards

GuidedPractice

3. Triangle JKL with vertices $J(-2, 2)$, $K(-8, 5)$, and $L(-4, 6)$ is a transformation of $\triangle PQR$ with vertices $P(2, -2)$, $Q(8, -5)$, and $R(4, -6)$. Graph the original figure and its image. Identify the transformation and verify that it is a congruence transformation.

Identify: eyeball
Verify: Do the math