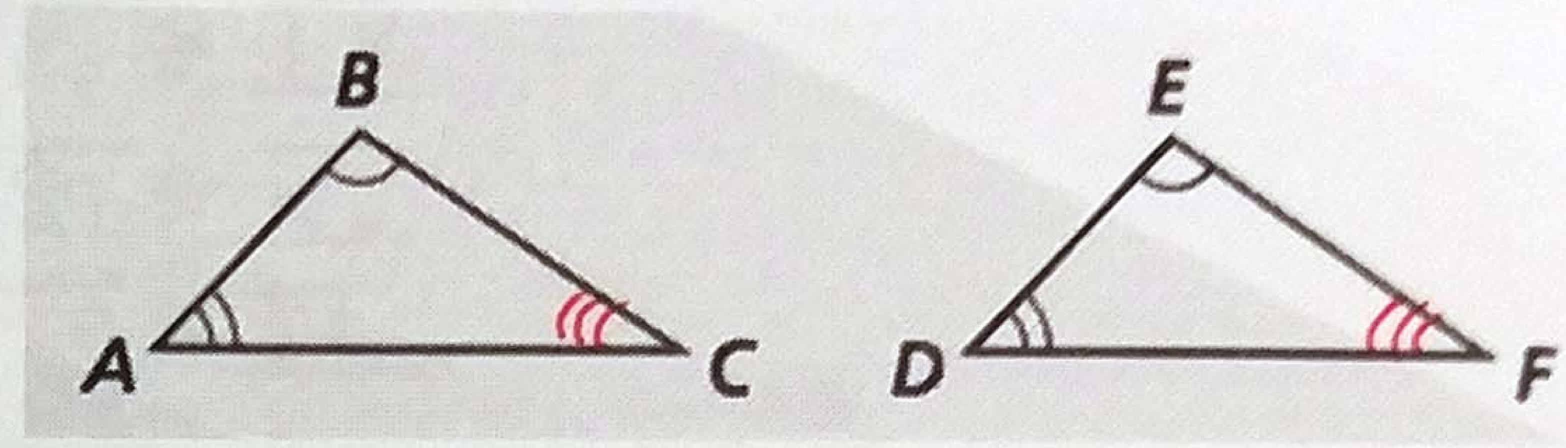
Key

Geometry 5.2 Notes: Congruent Polygons and Corresponding Parts

Third Angles Theorem

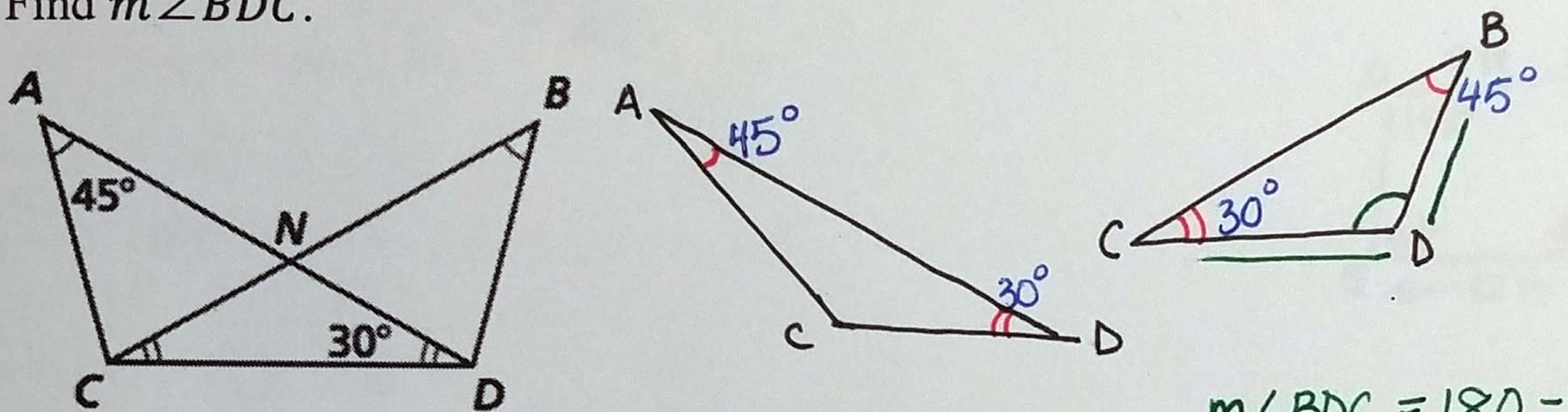
If two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.



IF $\angle A \cong \angle D$ AND $\angle B \cong \angle E$, THEN $\angle C \cong \angle F$.

Examples:

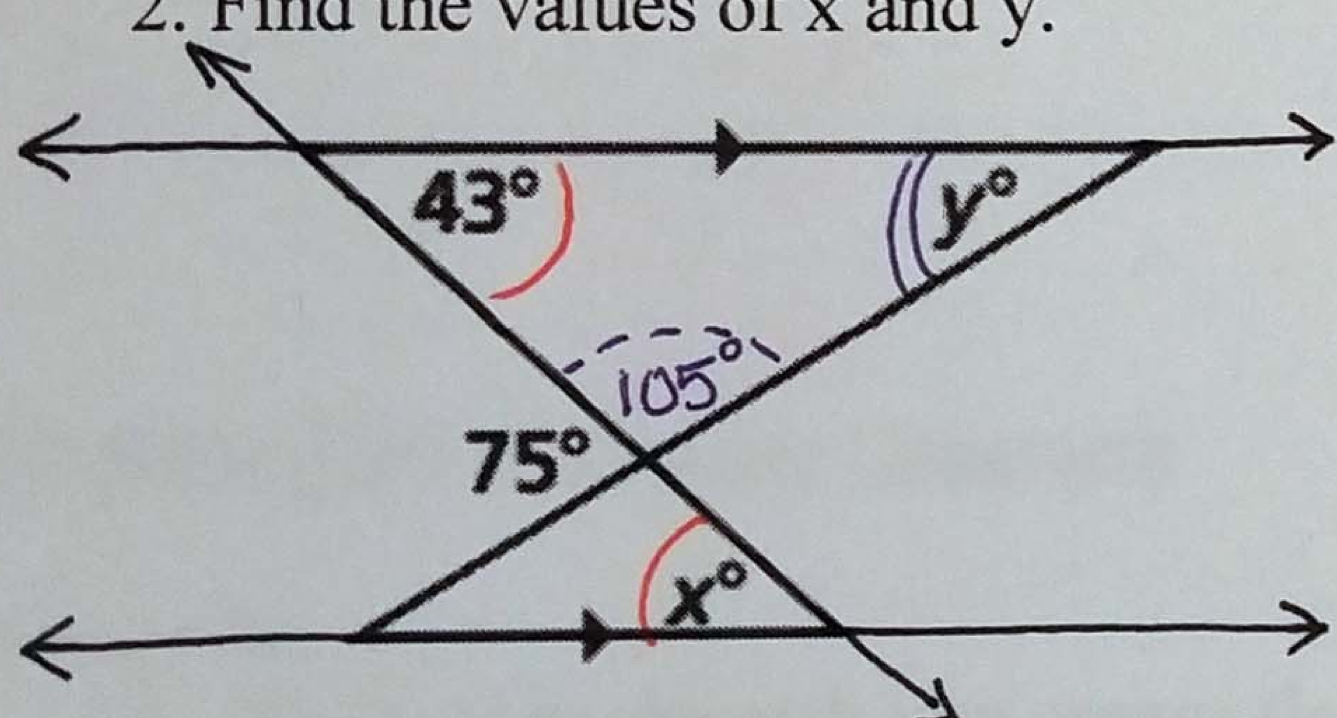
1. Find $m\angle BDC$.



$m\angle BDC = 180 - 30 - 45$

$\boxed{= 105°}$

2. Find the values of x and y.



ALTERNATE INTERIOR $\angle s \cong \rightarrow$ $\boxed{x = 43°}$

$y = 180 - 105 - 43$

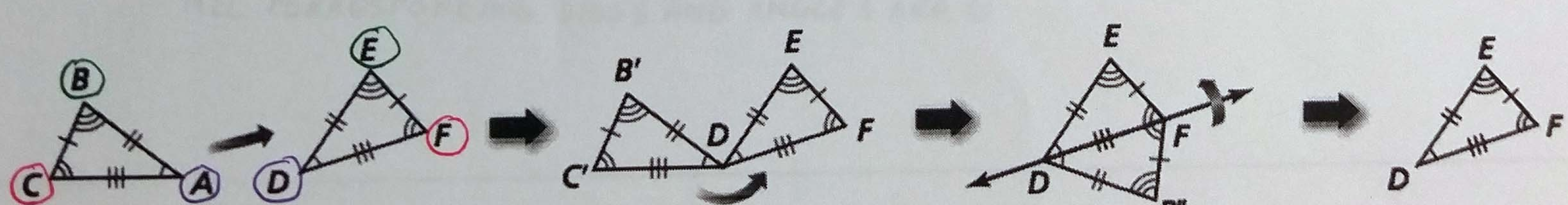
$\boxed{= 32°}$

From Chapter 4: Two figures are congruent if and only if a rigid motion or a composition of rigid motions maps each part of a figure onto the other.

→ A rigid motion maps each part of a figure to a **corresponding part** of its image.

→ Because rigid motions preserve length and angle measure, corresponding parts of congruent figures are congruent. This means that corresponding SIDES and corresponding ANGLES are $\cong$.

Using Rigid Motions to prove two figures are congruent



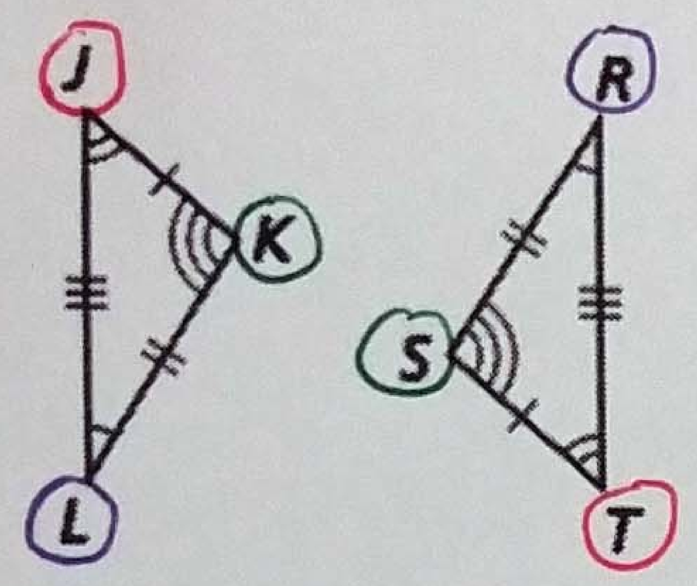
TRANSLATION (SLIDE/ MOVE) — ROTATION — REFLECTION (MIRROR IMAGE)

Now that we know the two triangles above are congruent, we can write a CONGRUENCE STATEMENT.

$\triangle BCA \cong \triangle EFD$

mple:

3. Write a congruence statement for the triangles. Identify all ~~parts~~ PAIRS of congruent, corresponding parts.



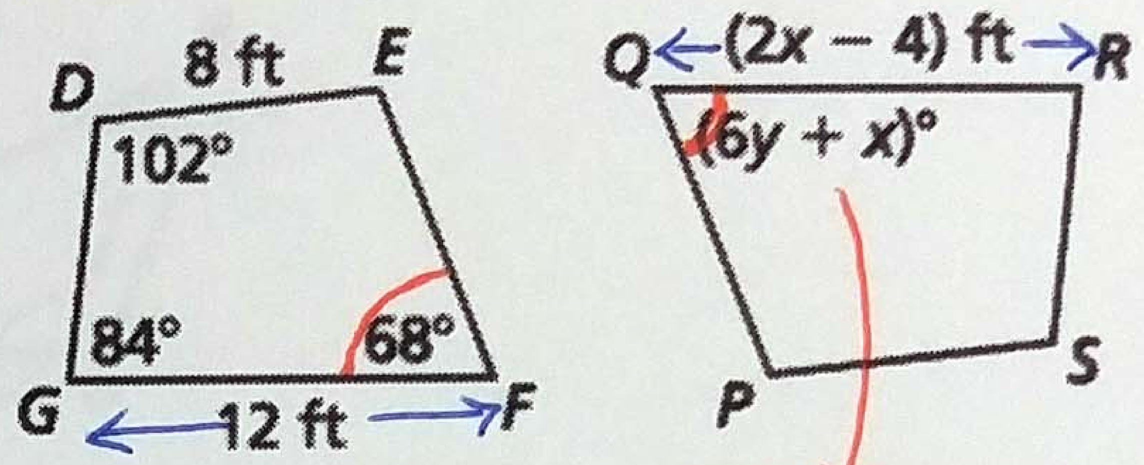
$\angle L \cong \angle \underline{R}$ $\overline{RS} \cong \overline{\underline{LK}}$

$\angle J \cong \angle \underline{T}$ $\overline{ST} \cong \overline{\underline{KJ}}$

$\angle K \cong \angle \underline{S}$ $\overline{TR} \cong \overline{\underline{JL}}$

$\triangle \underline{J}\,\underline{K}\,\underline{L} \cong \triangle \underline{T}\,\underline{S}\,\underline{R}$

4. In the diagram, $DEFG \cong SPQR$.



6y + x = 6y + 8 ← x = 8 FROM PART a

a. Find the value of x.

$\overline{QR} \cong \overline{FG}$

$2x - 4 = 12$

$2x = 16$

$\boxed{x = 8}$

b. Find the value of y.

$\angle Q \cong \angle F$

$6y + 8 = 68$

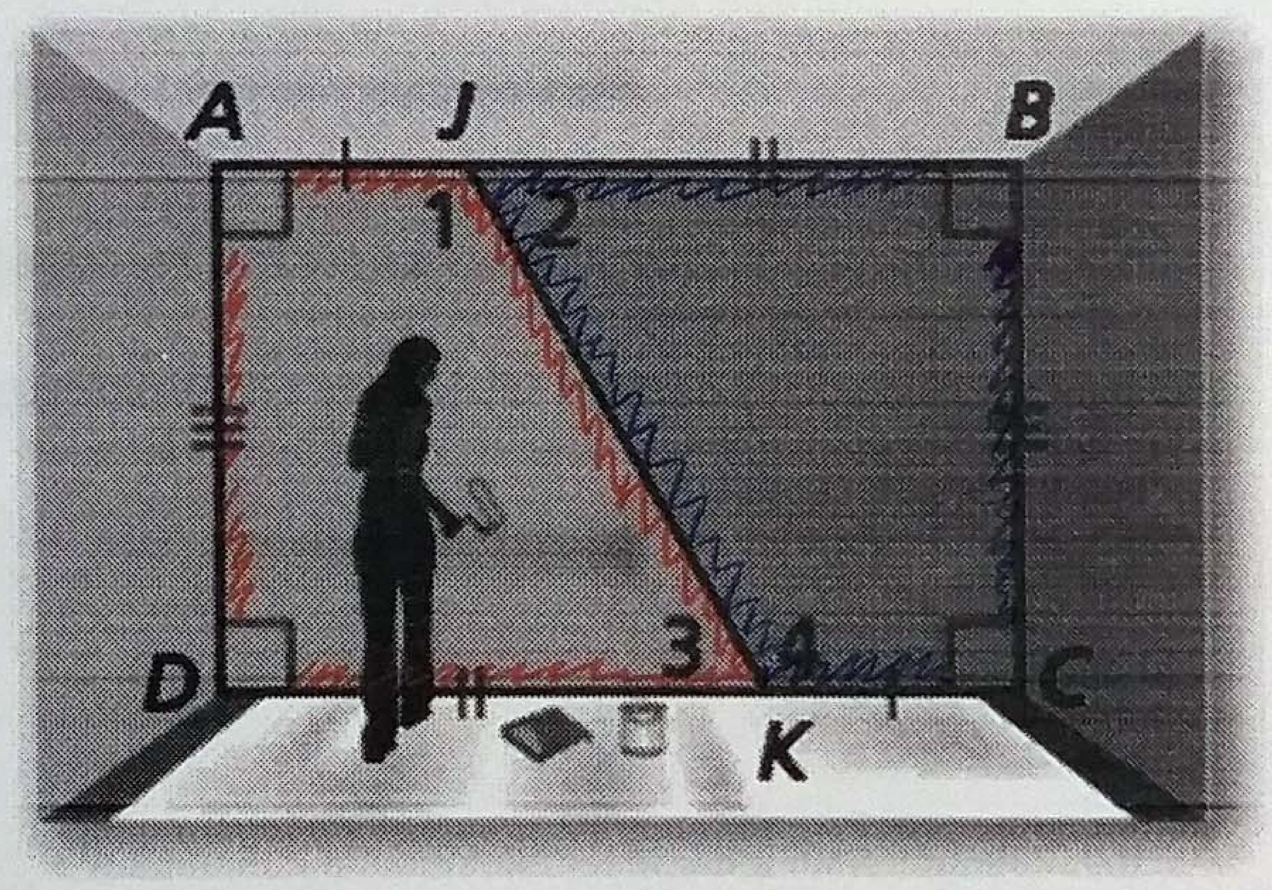
$6y = 60$

$\boxed{y = 10}$

Showing That Figures are Congruent

Example:

5. You divide the wall into orange (left) and blue (right) sections along $\overline{JK}$. Will the sections of the wall be the same size and shape? Explain.



$\overline{AB} \parallel \overline{DC}$: IF CONSEC. INT. ∠S SUPP. → ∥

$\angle 1 \cong \angle 4$: IF ∥ → ALT. INT. ∠S ≅

$\angle 2 \cong \angle 3$: IF ∥ → ALT. INT. ∠S ≅

$\overline{JK} \cong \overline{JK}$: REFLEXIVE PROP. OF ≅

YES, THEY ARE SAME SIZE AND SHAPE SINCE ALL CORRESPONDING SIDES AND ANGLES ARE ≅

Properties of Triangle Congruence

Reflexive: FOR ANY $\triangle ABC$, $\triangle ABC \cong \triangle ABC$

Symmetric: IF $\triangle ABC \cong \triangle DEF$, THEN $\triangle DEF \cong \triangle ABC$

Transitive: IF $\triangle ABC \cong \triangle DEF$ AND $\triangle DEF \cong \triangle GHI$, THEN $\triangle ABC \cong \triangle GHI$