Module 2b: Similar Triangles

Math Practice(s):

-Reason abstractly & quantitatively

-Construct viable arguments & critique the reasoning of others

Learning Target(s):

-Explore the relationship of angles in similar triangles.

Homework:

HW #8: 2b #1-4

Aug 8-12:20 PM

Warm-up

1. Determine the slope of the line that is perpendicular to graph of $f(x) = -\frac{7}{3}x + 4$.

$\frac{3}{7}$

$y = mx + b$

2. In the diagram below, $\angle BDC$ and $\angle CDE$ are supplementary angles. Set-up and solve an equation using the algebraic expression given for each angle to determine $m\angle BDC$ and $m\angle CDE$.

$4(5+3x) + \frac{1}{2}(6x+80) = 180$

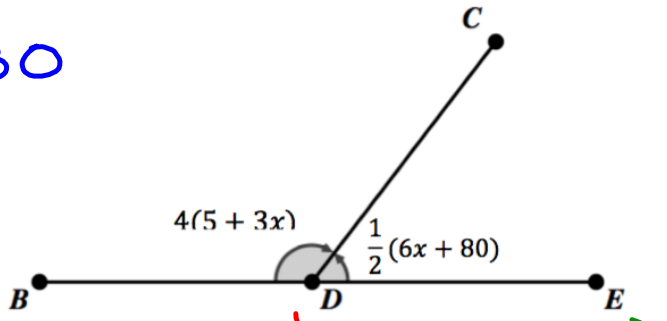
$20 + 12x + 3x + 40 = 180$

$15x + 60 = 180$

$-60 \quad -60$

$\frac{15x}{15} = \frac{120}{15}$

$x = 8$



$4(5+3(8))$ $\quad \frac{1}{2}(6(8)+80)$

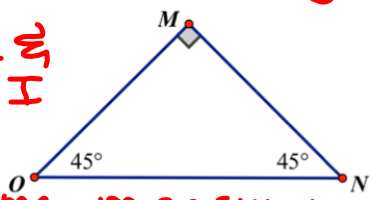
$4(5+24)$ $\quad \frac{1}{2}(48+80)$

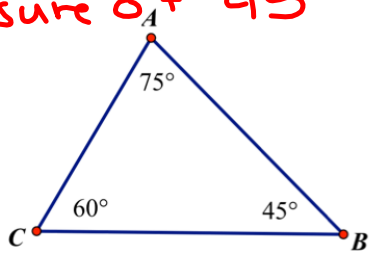
$4(29)$ $\quad \frac{1}{2}(128)$

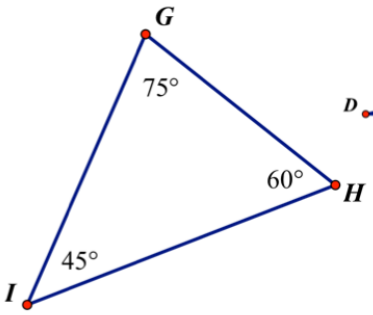
$m\angle BDC = 116°$ $\quad m\angle CDE = 64°$

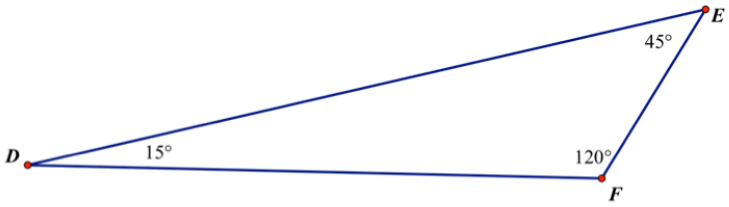
In the previous lesson, we grouped triangles together in multiple ways. One of those ways was by their angle measures. We saw that several triangles had the same angle measurements. What do you notice about the triangles below?

- △MON is a rt △
- All △s have an angle measure of 45°
- △ABC & △GHI have the same measurments, just rotated.









Similar Triangles exist if and only if their corresponding angles are ___≅___.

What can we say about the angles in the triangles above?

$\angle A \cong \angle G$
$\angle C \cong \angle H$
$\angle B \cong \angle I$

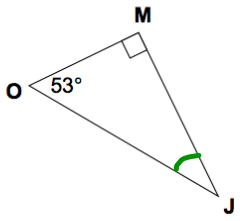
$\angle O \cong \angle N \cong \angle E \cong \angle I \cong \angle B$

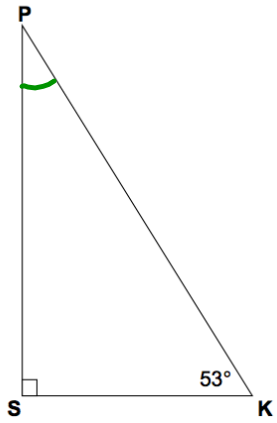
This means $\Delta ABC \sim \Delta GIH$.

symbol for similar

similarity statement

What can we say about the triangles?





$\angle M \cong \angle S$

$\angle O \cong \angle K$

$\angle J \cong \angle P$

$\triangle MOJ \sim \triangle SKP$

Theorem: Two right triangles are similar if and only if an acute angle in the first right triangle is $\cong$ to an acute angle in the second right triangle. (#THM).

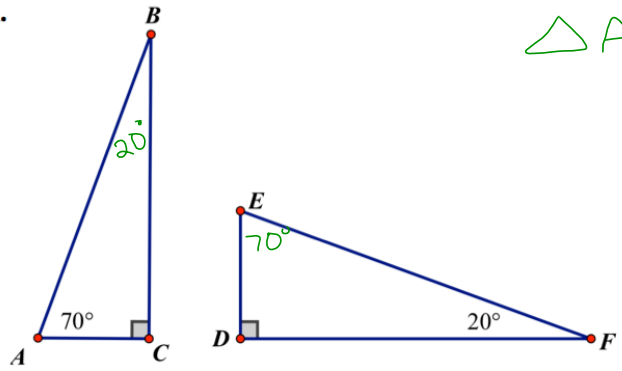
Practice

3. For each pair of triangles shown, determine the measure of each missing angle measure.

a. Then, if the triangles are similar, **use symbols to write a similarity statement** for the two triangles.

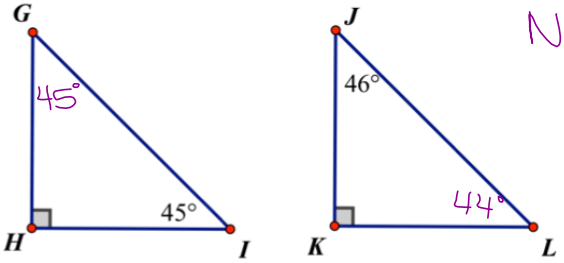
b. If the triangles are not similar, write "not similar".

A.



$\triangle ABC \sim \triangle EFD$

B.



Not Similar (their corresponding $\angle$ measures are not $\cong$)

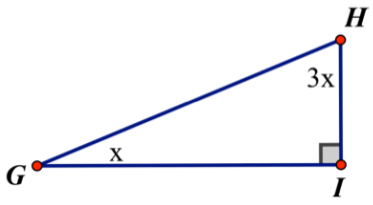
4. The given triangles in each pair below are similar.

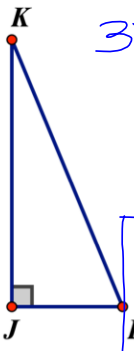
a) Use symbols to write a similarity statement for the two triangles.

b) [redacted], set-up and solve an equation to determine the measure of all angles that are unknown.

A.

$\triangle HIG \sim \triangle LJK$





$3x+x+90=180$

$4x=90$

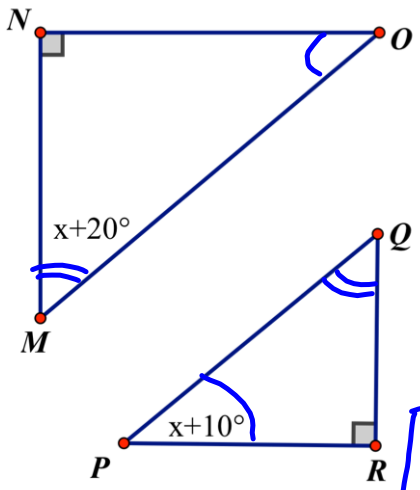
$3x+x=90$

$x=22.5$

$m\angle G = m\angle K = 22.5^\circ$

$m\angle H = m\angle L = 67.5^\circ$

B.



$\triangle NMO \sim \triangle RQP$

$x+10 + x+20 = 90$

$2x+30=90$

$2x=60$

$x=30$

$m\angle M = m\angle Q = 50^\circ$

$m\angle O = m\angle P = 40^\circ$