Today's Plan:

Learning Target (standard): I will use the Law of Sines to solve triangles.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, take notes over new material and complete practice problems over new concepts.

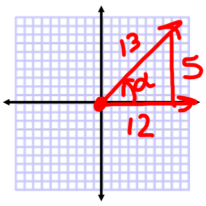
Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

Find the exact value.

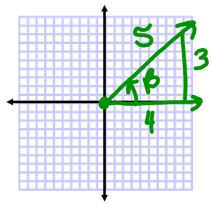
$$\sec\left(\sin^{-1}\frac{5}{13} - \tan^{-1}\frac{3}{4}\right)$$



$= \sec(\alpha - \beta)$

$= \dfrac{1}{\cos(\alpha - \beta)}$

$= \dfrac{1}{\cos\alpha\cos\beta + \sin\alpha\sin\beta}$



$= \dfrac{1}{\left(\frac{12}{13}\right)\left(\frac{4}{5}\right) + \left(\frac{5}{13}\right)\left(\frac{3}{5}\right)}$

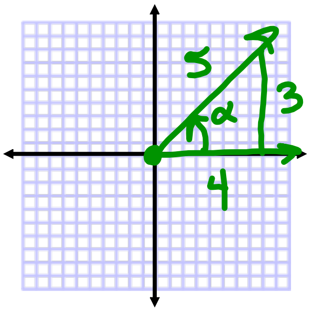
$= \dfrac{1}{\frac{48}{65} + \frac{15}{65}}$

$= \dfrac{1}{\frac{63}{65}}$

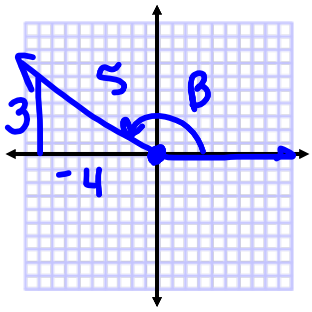
$= \dfrac{65}{63}$

Find the exact value.

$$\sin\left[\sin^{-1}\frac{3}{5}-\cos^{-1}\left(-\frac{4}{5}\right)\right]$$



$= \sin(\alpha-\beta)$



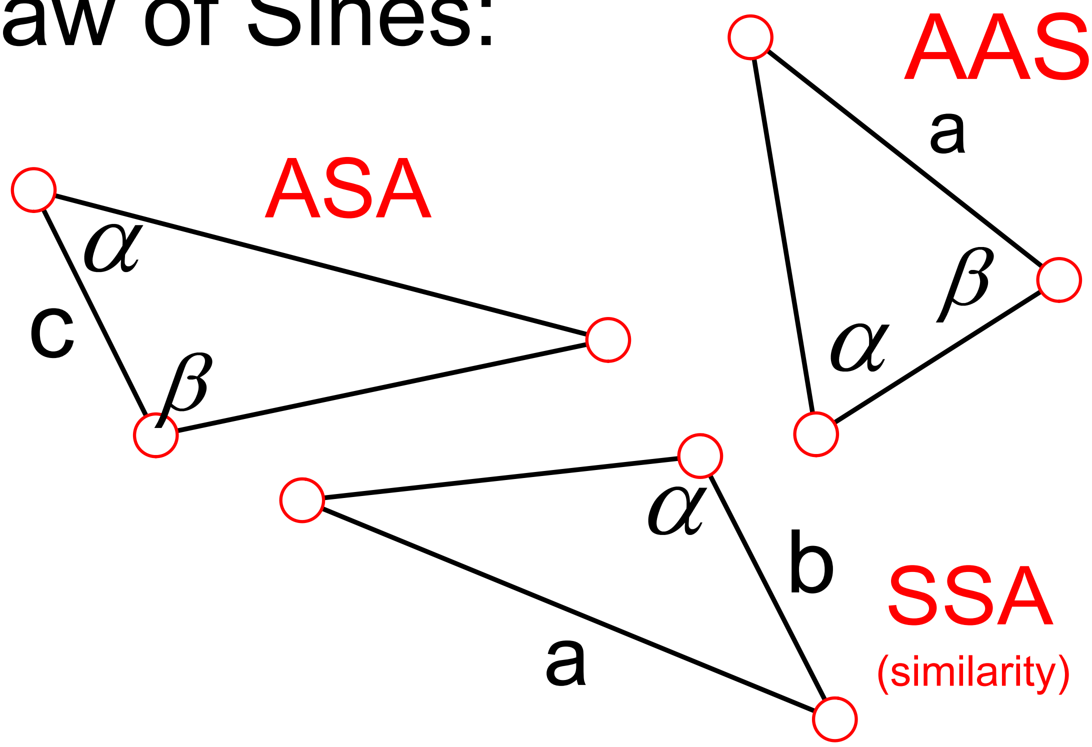
$= \sin\alpha\cos\beta-\cos\alpha\sin\beta$

$= \left(\frac{3}{5}\right)\left(-\frac{4}{5}\right)-\left(\frac{4}{5}\right)\left(\frac{3}{5}\right)$

$= -\frac{12}{25}-\frac{12}{25}$

$= -\frac{24}{25}$

Law of Sines:



Law of Sines:

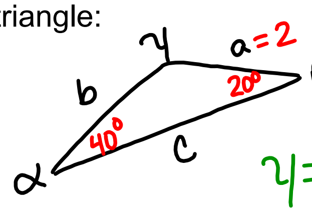
$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$$

Solve the triangle:

$\alpha = 40°$

$\beta = 20°$

$a = 2$



AAS

$\gamma = 180° - 40° - 20°$

$\gamma = 120°$

$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b}$

$\frac{\sin 40°}{2} = \frac{\sin 20°}{b}$

$b \sin 40° = 2 \sin 20°$

$b = \frac{2\sin 20°}{\sin 40°}$

$b = 1.064$

$\frac{\sin\alpha}{a} = \frac{\sin\gamma}{c}$

$\frac{\sin 40°}{2} = \frac{\sin 120°}{c}$

$c \sin 40° = 2 \sin 120°$

$c = \frac{2\sin 120°}{\sin 40°}$

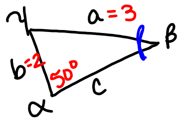
$c = 2.695$

Determine whether the given information results in one, two, or no triangles.
Solve any triangle(s) that result.

$a = 3$

$b = 2$

$\alpha = 50°$



SSA

$\gamma = 180° - 50° - 30.710°$

$\gamma = 99.29°$

$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b}$

$\frac{\sin 50°}{3} = \frac{\sin\beta}{2}$

$3\sin\beta = 2\sin 50°$

$\sin\beta = \frac{2\sin 50°}{3}$

$\sin\beta = 0.5107$

$\beta = \sin^{-1}(0.5107)$ <-1, >1 no triangle

$\beta = 30.710°$

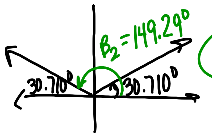
$\frac{\sin\alpha}{a} = \frac{\sin\gamma}{c}$

$\frac{\sin 50°}{3} = \frac{\sin 99.29°}{c}$

$c\sin 50° = 3\sin 99.29°$

$c = \frac{3\sin 99.29°}{\sin 50°}$

$c = 3.865$



1 triangle

$\gamma_2 = 180° - 149.29° - 50°$

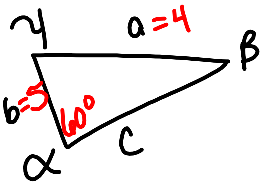
$\gamma_2 = -19.29°$ not possible

Determine whether the given information results in one, two, or no triangles.
Solve any triangle(s) that result.

$a = 4$

$b = 5$

$\alpha = 60°$



SSA

$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b}$

$\frac{\sin 60°}{4} = \frac{\sin\beta}{5}$

$4\sin\beta = 5\sin 60°$

$\sin\beta = \frac{5\sin 60°}{4}$

$\sin\beta = 1.0825 > 1$

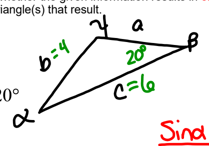
no triangle

Determine whether the given information results in one, two, or no triangles.
Solve any triangle(s) that result.

$b = 4$

$c = 6$

$\beta = 20°$



SSA

$$\frac{\sin\beta}{b} = \frac{\sin\gamma}{c}$$

$$\frac{\sin 20°}{4} = \frac{\sin\gamma}{6}$$

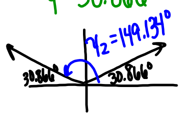
$$4\sin\gamma = 6\sin 20°$$

$$\sin\gamma = \frac{6\sin 20°}{4}$$

$$\sin\gamma = 0.5130$$

$$\gamma = \sin^{-1}(0.5130)$$

$$\gamma = 30.866°$$



$$\alpha_1 = 180° - 20° - 30.866°$$

$$\alpha_1 = 129.134°$$

$$\alpha_2 = \beta + \gamma_2 = 20° + 149.134° < 180°$$

$$\alpha_2 = 10.866°$$

2 triangles

$$\frac{\sin\alpha_1}{a_1} = \frac{\sin\beta}{b}$$

$$\frac{\sin 129.134°}{a_1} = \frac{\sin 20°}{4}$$

$$a_1\sin 20° = 4\sin 129.134°$$

$$a_1 = \frac{4\sin 129.134°}{\sin 20°}$$

$$a_1 = 9.072$$

$$\frac{\sin\alpha_2}{a_2} = \frac{\sin\beta}{b}$$

$$\frac{\sin 10.866°}{a_2} = \frac{\sin 20°}{4}$$

$$a_2\sin 20° = 4\sin 10.866°$$

$$a_2 = \frac{4\sin 10.866°}{\sin 20°}$$

$$a_2 = 2.205$$

$\gamma_1 = 30.866°$	$\gamma_2 = 149.134°$
$\alpha_1 = 129.134°$	$\alpha_2 = 10.866°$
$a_1 = 9.072$	$a_2 = 2.205$

Assignment:

p.538 #4-28 (by4)

* Draw ALL appropriate diagrams! *