Today's Plan:

Learning Target (standard): I will use the Law of Cosines 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.

p.546 #4-24 (by 4)

$4) b \approx 3.19$

$\alpha \approx 12.4^\circ$

$\gamma \approx 147.6^\circ$

$8) \alpha \approx 68^\circ$

$\beta \approx 44^\circ$

$\gamma \approx 68^\circ$

$12) c \approx 5.29$

$\alpha \approx 79.1^\circ$

$\beta \approx 40.9^\circ$

$16) b \approx 3.61$

$\alpha \approx 56.3^\circ$

$\gamma \approx 33.7^\circ$

$20) \alpha \approx 70.5^\circ$

$\beta \approx 70.5^\circ$

$\gamma \approx 39^\circ$

$24) \alpha \approx 61^\circ$

$\beta \approx 42.8^\circ$

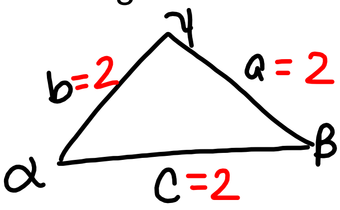
$\gamma \approx 76.2^\circ$

Solve each triangle:

$a = 2$

$b = 2$

$c = 2$



$a^2 = b^2 + c^2 - 2bc\cos\alpha$

$2^2 = 2^2 + 2^2 - 2(2)(2)\cos\alpha$

$4 = 4 + 4 - 8\cos\alpha$

$4 = 8 - 8\cos\alpha$

$-4 = -8\cos\alpha$

$\cos\alpha = \frac{1}{2}$

$\alpha = \cos^{-1}\left(\frac{1}{2}\right)$

$\alpha = 60^\circ$

equilateral triangle

$\alpha = \beta = \gamma$

$\alpha = 60^\circ$

$\beta = 60^\circ$

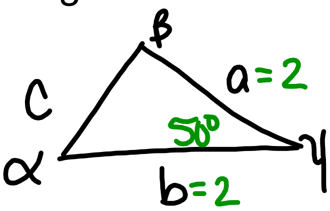
$\gamma = 60^\circ$

Solve each triangle:

$a = 2$

$b = 2$

$\gamma = 50^\circ$



SAS

$\alpha = \beta$ isosceles triangle

$180^\circ - 50^\circ = 130^\circ$

$\alpha = 65^\circ$

$\beta = 65^\circ$

$c^2 = a^2 + b^2 - 2ab\cos\gamma$

$c^2 = 2^2 + 2^2 - 2(2)(2)\cos 50^\circ$

$c^2 = 4 + 4 - 8\cos 50^\circ$

$c^2 = 8 - 8(.6428)$

$c^2 = 2.8577$

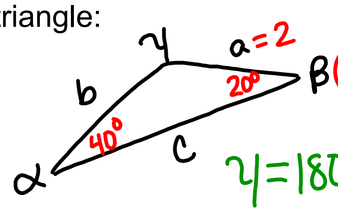
$c = 1.690$

Solve the triangle:

$\alpha = 40°$

$\beta = 20°$

$a = 2$



AAS

$\gamma = 180° - 40° - 20°$

$\gamma = 120°$

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

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

$b\sin 40° = 2\sin 20°$

$b = \dfrac{2\sin 20°}{\sin 40°}$

$b = 1.064$

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

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

$c\sin 40° = 2\sin 120°$

$c = \dfrac{2\sin 120°}{\sin 40°}$

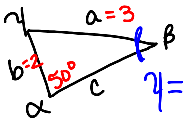
$c = 2.695$

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

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

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

$3\sin\beta = 2\sin 50°$

$\sin\beta = \dfrac{2\sin 50°}{3}$

$\sin\beta = 0.5107$

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

$\beta = 30.710°$

$\gamma = 180° - 50° - 30.710°$

$\gamma = 99.29°$

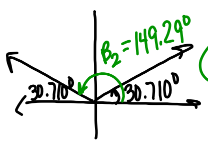
$\dfrac{\sin\alpha}{a} = \dfrac{\sin\gamma}{c}$

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

$c\sin 50° = 3\sin 99.29°$

$c = \dfrac{3\sin 99.29°}{\sin 50°}$

$c = 3.865$

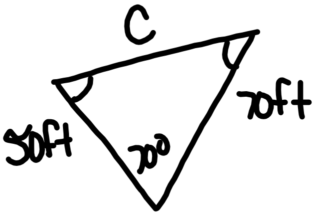


1 triangle

$\gamma_2 = 180° - 149.29° - 50°$

$\gamma_2 = -19.29°$ not possible

To find the distance from the house at A to the house at B, a surveyor measures the angle ACB, which is found to be 70°, and then walks off the distance to each house, 50 feet and 70 feet, respectively. How far apart are the houses? $c = ?$ SAS



$$c^2 = a^2 + b^2 - 2ab\cos\gamma$$
$$c^2 = 70^2 + 50^2 - 2(70)(50)\cos 70^\circ$$
$$c^2 = 4900 + 2500 - 7000(.3420)$$
$$c^2 = 7400 - 2394.1410$$
$$c^2 = 5005.859$$
$$c = 70.752 \text{ ft}$$

In attempting to fly from Chicago to Louisville, a distance of 330 miles, a pilot inadvertently took a course that was 10° in error.

a) If the aircraft maintains an average speed of 220 miles per hour and if the error in direction is discovered after 15 minutes, through what angle should the pilot turn to head toward Louisville?

b) What new average speed should the pilot maintain so that the total time of the trip is 90 minutes?

a) 220 mph 15min

SAS

$d = r \cdot t$

$d = 220\left(\frac{1}{4}\right) = 55\text{mi}$

$$a^2 = 330^2 + 55^2 - 2(330)(55)\cos 10^\circ$$
$$a^2 = 108900 + 3025 - 36300(.9848)$$
$$a^2 = 111925 - 35748.521$$
$$a^2 = 76176.4786$$
$$a = 276.000 \text{ mi}$$

$$330^2 = 55^2 + 276^2 - 2(55)(276)\cos\alpha$$
$$108900 = 3025 + 76176.4786 - 30360\cos\alpha$$
$$29698.5214 = -30360\cos\alpha$$
$$\cos\alpha = -0.9782$$
$$\alpha = 168.018^\circ$$

$$\beta = 180^\circ - 168.018^\circ$$
$$\beta = 11.982^\circ$$

b) 276 mi in 75 min $75\text{min} = \frac{75}{60}\text{hr}$

$d = r \cdot t$

$276 = r\left(\frac{75}{60}\right)$

$r = 220.8 \text{ mph}$

Assignment:

p.546 #26,28,30,32,34

* Draw ALL appropriate diagrams! *