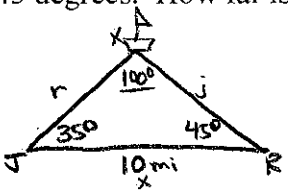
Math 4 – Extended Trig 1
WS 5.7: Law of Sines/Cosines Apps (2)

Name KEY
Date _____ Day ___

Draw a picture and solve.

1. Juan and Romelia are standing at the seashore 10 miles apart. The coastline is a straight line between them. Both can see the same ship in the water. The angle between the coastline and the line between the ship and Juan is 35 degrees. The angle between the coastline and the line between the ship and Romelia is 45 degrees. How far is the ship from Juan?

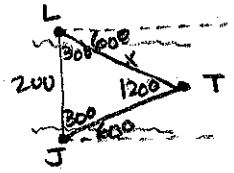


$\frac{\sin 100^\circ}{10} = \frac{\sin 45^\circ}{r}$

$\frac{r \sin 100^\circ}{\sin 100} = \frac{10 \sin 45}{\sin 100}$

7.18 miles

2. Jack is on one side of a 200-foot-wide canyon and Jill is on the other. Jack and Jill can both see the trail guide at an angle of depression of 60 degrees. How far are they from the trail guide?

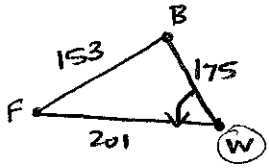


$\frac{\sin 120^\circ}{200} = \frac{\sin 30^\circ}{X}$

$\frac{X \sin 120^\circ}{\sin 120^\circ} = \frac{200 \sin 30^\circ}{\sin 120^\circ}$

115.47 feet

3. Fred, Barney and Wilma are camping in their tents. If the distance between Fred and Barney is 153 feet, the distance between Fred and Wilma is 201 feet, and the distance between Barney and Wilma is 175 feet, what is the angle between Barney, Wilma and Fred?



$153^2 = 201^2 + 175^2 - 2(201)(175)\cos W$

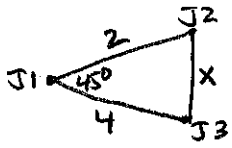
$23409 = 71026 - 70350 \cos W$

$-47617 = -70350 \cos W$

$.67685 = \cos W$

47.4°

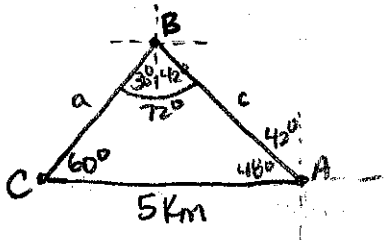
4. Three boats are at sea: Jenny one (J1), Jenny two (J2), and Jenny three (J3). The crew of J1 can see both J2 and J3. The angle between the line of sight to J2 and the line of sight to J3 is 45 degrees. If the distance between J1 and J2 is 2 miles and the distance between J1 and J3 is 4 miles, what is the distance between J2 and J3?



$x^2 = 2^2 + 4^2 - 2(2)(4)\cos 45^\circ$

8.69 miles

5. The course for a boat race starts at point A and proceeds in the direction N42°W to point B, then in the direction S30°W to point C, and finally back to A. Point C lies 5 km directly west of point A. Approximate the total distance of the race course.



$\frac{\sin 72}{5} = \frac{\sin 48}{a}$

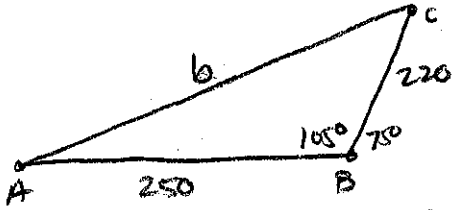
$a = 3.91$

$\frac{\sin 72}{5} = \frac{\sin 60}{c}$

$c = 4.55$

13.46 Km

6. To approximate the length of a marsh, a surveyor walks 250 meters from point A to point B, then turns 75° northward and walks 220 meters to point C. Approximate the length AC of the marsh.



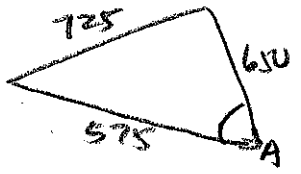
$b^2 = 250^2 + 220^2 - 2(250)(220)\cos 105°$

$b^2 = 139370.095$

$b = 373$

373.32 m

7. A triangular parcel of ground has sides of lengths 725 feet, 650 feet, 575 feet. Find the measure of the largest angle.



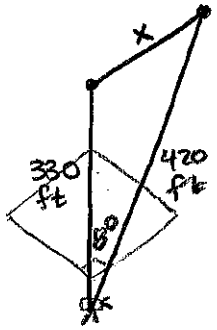
$725^2 = 650^2 + 575^2 - 2(650)(575)\cos A$

$-227500 = -747500\cos A$

$.30434 = \cos A$

72.28°

8. A baseball player in center field is standing approximately 330 feet from the television camera that is directly behind home plate. A batter hits a fly ball that goes to the wall 420 feet from the camera. Approximate how far the center fielder has to run to make the catch if the camera turn 8° to follow the play.



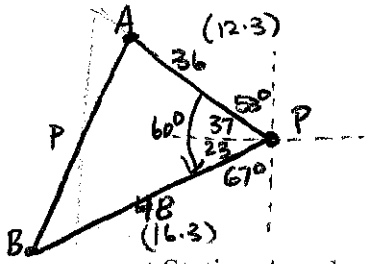
$x^2 = 330^2 + 420^2 - 2(330)(420)\cos 8°$

$x^2 = 10797.69$

$x = 103.91$

103.91 feet

9. Two ships leave a port at 9:00AM. One travels at a bearing of N53°W at 12 mph and the other travels at a bearing of S67°W at 16 mph. Approximate how far apart they are at noon that day.



$p^2 = 36^2 + 48^2 - 2(36)(48)\cos 60°$

$p^2 = 1872$

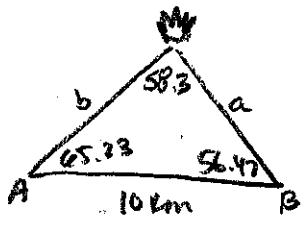
$p = 43.27$

43.27 miles

10. Two rangers, one at Station A and one at Station B, observe a fire in the forest. The angle at Station A formed by the lines of sight to Station B and to the fire is 65.23°. The angle at Station B formed by the lines of sight to Station A and to the fire is 56.47°. The stations are 10 km apart.

a. How far from Station A is the fire?

b. How far from Station B is the fire?



$\frac{\sin 58.3}{10} = \frac{\sin 65.23}{a}$ $\quad$ $\frac{\sin 58.3}{10} = \frac{\sin 56.47}{b}$

STATION A: 9.797 km

STATION B: 10.67 km