Law of Sines/Cosines

Name _____ Key _____

Date _____ Hour _____
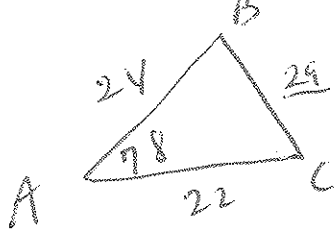
Solve each triangle, round to the nearest whole number.

1) m<A = 109°, m<B = 34°, c = 14

$$\frac{14}{\sin 37} = \frac{b}{\sin 34} = \frac{9}{\sin 109}$$

m∠C = 37°; b = 13, a = 22

2) c = 24, b = 22, m<A = 78°
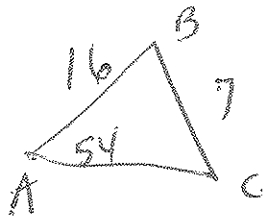

$$a^2 = 24^2 + 22^2 - 2(24)(22)\cos 78$$

$$29 = a$$

$$\frac{29}{\sin 78} = \frac{22}{\sin B}$$

48 = B / 1~~3~~   C = 54

a = 29, m∠B = 48, m∠C = 54

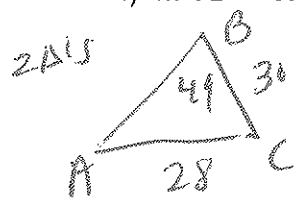3) m<A = 52°, c = 16, a = 7

$$\frac{7}{\sin 54} = \frac{16}{\sin C}$$

No Δ ents

4) m<B = 49°, a = 30, b = 28

$$\frac{28}{\sin 49} = \frac{30}{\sin A} = \sin 77°$$

54° = A   126° = A
77° = C   5° = C
36 = c   3 = c

m∠A = 54° m∠C = 77°, c = 36 / m∠A = 126 m∠C = 5°
c = 3

5) c = 13, a = 21, b = 29
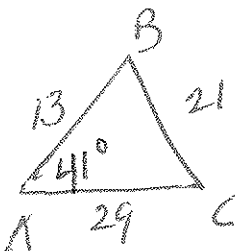
$$21^2 = 13^2 + 29^2 - 2(13)(29)\cos A$$

41° = A

$$\frac{21}{\sin 41°} = \frac{29}{\sin B}$$

~~65°~~ B | 115 = B°
~~74~~ C | 24° C°

A = 41° B = 115°, C = 24°

6) a = 9, b = 12, c = 13
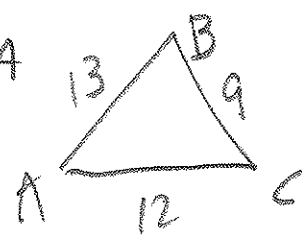
$$13^2 = 9^2 + 12^2 - 2(9)(12)\cos C$$

75° = C

$$\frac{13}{\sin 75} = \frac{9}{\sin A}$$

A = 42° / ~~13~~°
B = 63°

A = 42°, B = 63°, C = 75°

Draw a picture, write and equation and solve, include labels.

7) Juan and Rose 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 Rose is 45 degrees. How far is the ship from Juan?
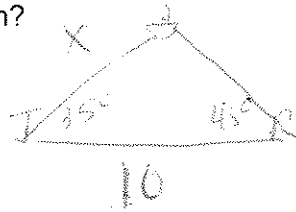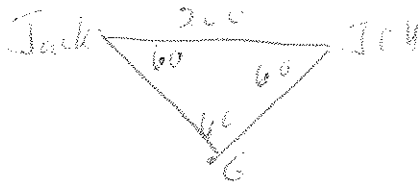
$$\frac{10}{\sin 100} = \frac{x}{\sin 45}$$

$$7.2 = x$$

7) _____ 7.2 miles

8) 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?

$$\frac{200}{\sin 60} = \frac{x}{\sin 60}$$

8) _____ 200 ft

9) Two towns 21 miles apart are separated by a dense forest. To travel from town A to town B, a person must go 17 miles on a bearing of 325°, then turn and continue for 9 miles to reach town B. Find the bearing from A to B.
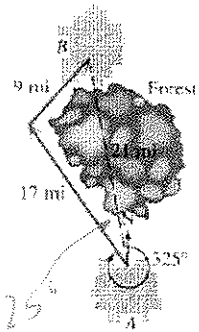
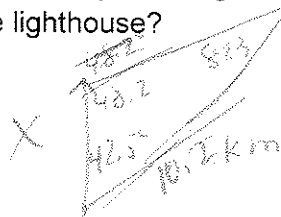$$9^2 = 17^2 + 21^2 - 2(17)(21)\cos A$$

$$35 = A$$

9) _____ N 10° W

OR

350°

10) 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?

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

$$x = 2.9$$

10) _____ 3 miles

11) A ship is sailing due north. At a certain point the bearing of a lighthouse 10.2 km away is N 42.5° E. Later on, the captain notices that the bearing of the light house has become S 48.2° E. How far did the ship travel between the two observations of the lighthouse?

$$\frac{x}{\sin 84.3} = \frac{10.2}{\sin 48.2}$$

11) _____ 13.7 Km