

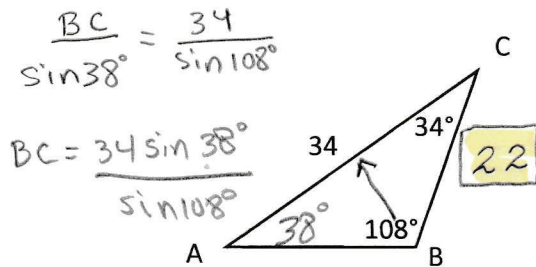
The LAW OF SINES is a powerful tool which is used to find missing sides or angles of ANY triangle with a given side and its opposite angle. The equation is:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Because it is a simple proportion, it can also be used like this:

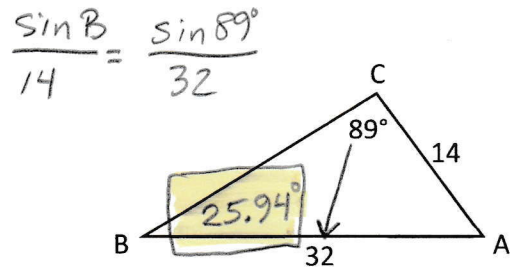
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

1) Find the measure of \overline{BC} :



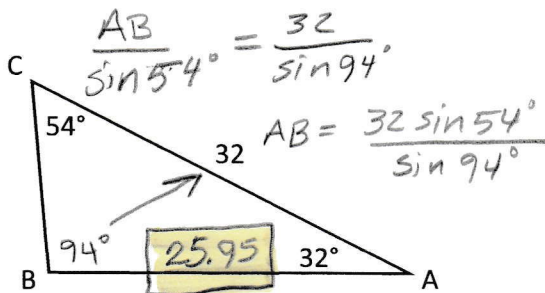
$180^\circ - 108^\circ - 34^\circ = 38^\circ$

2) Find the measure of $\angle B$:



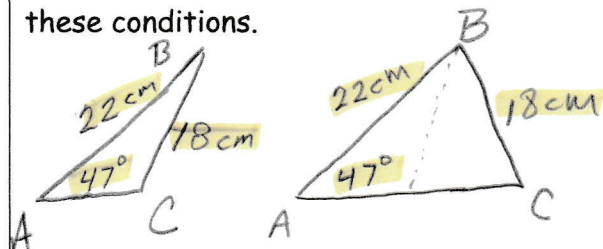
$\sin B = \frac{14 \sin 89^\circ}{32}$ $B = \sin^{-1}(.4374)$

3) Find the measure of \overline{AB} :

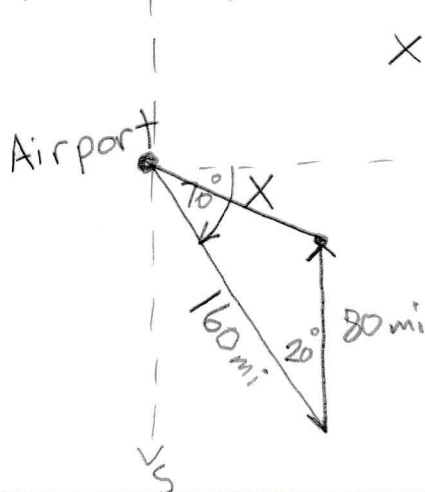


$\angle B = 180^\circ - 54^\circ - 32^\circ$

4) For $\triangle ABC$, $\angle A$ is 47° , side c is 22 cm, side a is 18 cm. Draw two triangle that both meet these conditions.



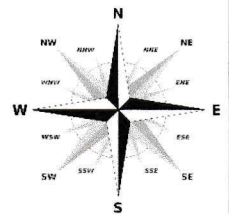
5) A plane leaves San Francisco and flies 70° south of east for 160 miles. The plane then changes course and flies due north for another 80 miles before turning and flying directly back to the airport. How many miles was the last stage back to the airport? (hint: draw a picture)



$$X^2 = 80^2 + 160^2 - 2(80)(160)\cos 20^\circ$$

$X^2 = 7943.869$

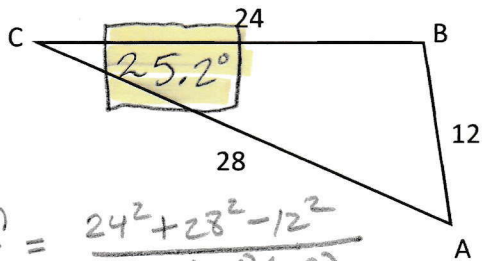
$X \approx 89.13 \text{ mi}$



The LAW OF COSINES is a powerful tool which is used to find missing sides or angles of ANY triangle. The equation for calculating a missing side is: $a^2 = b^2 + c^2 - (2bc)\cos A$

The equation can be rewritten to find a missing angle like this: $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

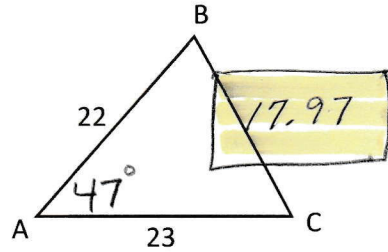
6) Find the measure of $\angle C$:



$$\cos C = \frac{24^2 + 28^2 - 12^2}{2(24)(28)}$$

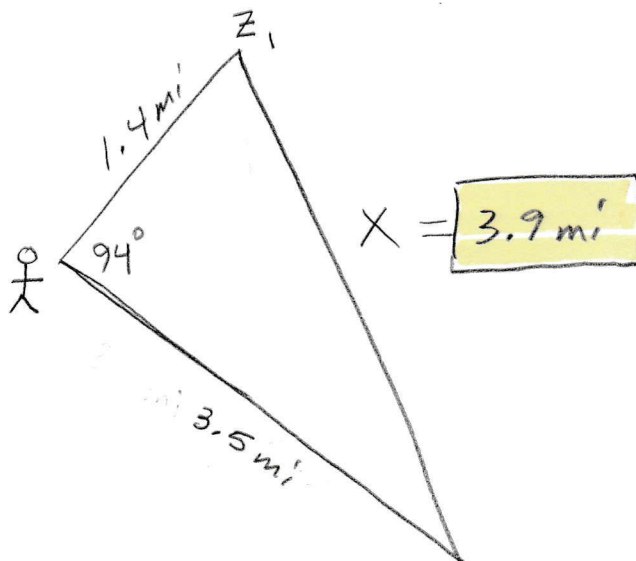
$$\angle C = \cos^{-1}(.9048)$$

7) Find all missing angles and sides:



$$a^2 = 23^2 + 22^2 - 2(23)(22)\cos 47^\circ$$

8) An ecologist is studying a pair of zebras fitted with radio-transmitter collars. One zebra is 1.4 miles from the ecologist and the other is 3.5 miles from the ecologist. The ecologist measures the angle between his lines of sight to each zebra to be 94° . To the nearest tenth of a mile, how far apart are the two zebras? (hint: draw a picture)



$$X^2 = (3.5)^2 + (1.4)^2 - 2(3.5)(1.4)\cos 94^\circ$$