Mathematics 11U

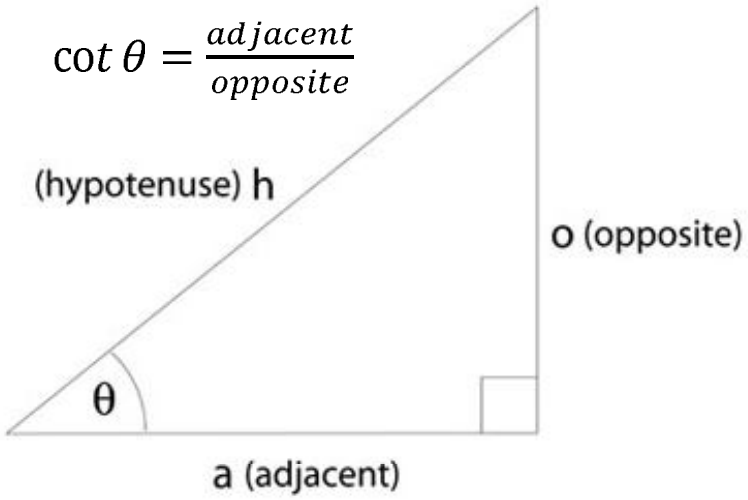
5.1 – Trigonometric Ratios of Acute Angles **Homework: pg 280 #1,4,6,7,9,11a,12**

Three Primary and Three Reciprocal Ratios.

$$\sin\theta = \frac{opposite}{hypotenuse} \qquad \csc\theta = \frac{hypotenuse}{opposite}$$

$$\cos\theta = \frac{adjacent}{hypotenuse} \qquad \sec\theta = \frac{hypotenuse}{adjacent}$$

$$\tan\theta = \frac{opposite}{adjacent} \qquad \cot\theta = \frac{adjacent}{opposite}$$



There are no *csc, sec, cot* buttons on the calculator!

Determine the following ratios:

1. $\sin 36$

2. $\tan 123$

3. $\sec 23$

4. $\cot 75$

Determine the following angles:

1. $\sin\theta = 0.2745$

2. $cos\,\theta = 0.8175$

3. $csc\,\theta = 1.2241$

4. $cot\,\theta = 5.3267$

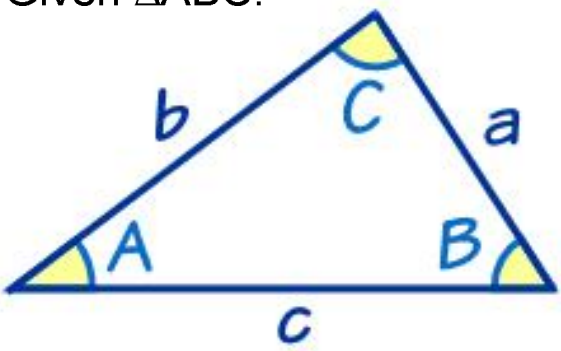
A word problem:

From a position some distance away from the base of a tree, Monique uses a clinometer and determines that the angle of elevation to the top of the tree is 16.7^{o}. Monique estimates that the high of the tree is 3m. How far away is Monique from the base of the tree?

5.6 – Sine Law

Homework: pg 318 #1,4,7,8,9,12

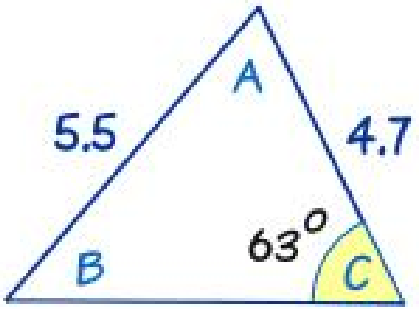
Given ΔABC:



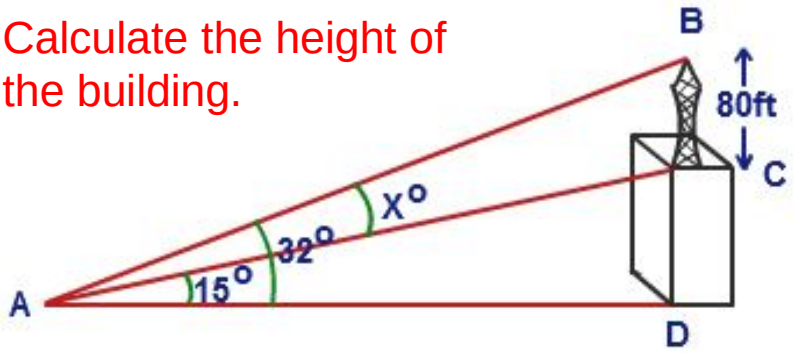
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

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

Solve ΔABC:



Calculate the height of the building.



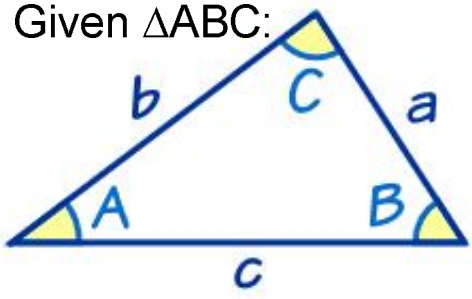
A word problem with an issue:

A tower is supported by guy wires. One wire is 30m with an angle of elevation of 55°. Another wire is 22m. How far apart are these two wires?

5.7 – Cosine Law

Homework: pg 326 #4,5,6,7,10

Given ΔABC:



To find the missing 3rd side:

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

$$b^2 = a^2 + c^2 - 2ac\cos B$$

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

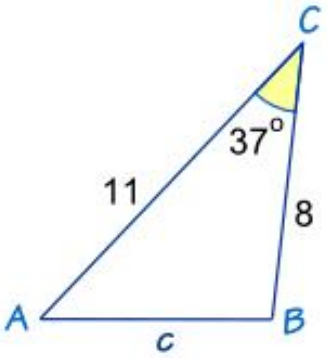
To find an angle if you have all 3 sides:

$$\cos C = \frac{c^2 - a^2 - b^2}{-2ab}$$

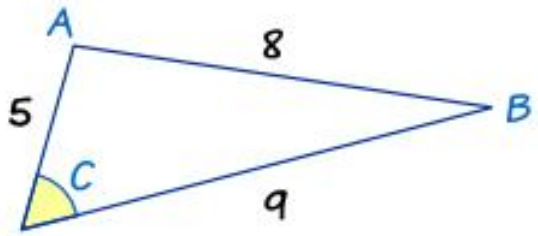
$$\cos B = \frac{b^2 - a^2 - c}{-2ac}$$

$$\cos A = \frac{a^2 - b^2 - c^2}{-2bc}$$

Solve ∆ABC:



Solve ∆ABC:



5.8 – Three Dimensional Trigonometry

Homework: pg 332 3a,4,5,6,11 #7 is a super challenge

Emma is on a 50 m high bridge and sees two boats anchored below. From her position, boat A has a bearing of 230° and boat B has a bearing of 120°. Emma estimates the angles of depression to be 38° for boat A and 35° for boat B. How far apart are the boats to the nearest metre?