

Practice of Trigonometry

Learning goal

- identify the type of question
- solve for angles and sides

When do I use?

Pythagorean Theorem

$$a^2 + b^2 = c^2$$

right angled \triangle

3 sides \rightarrow 1 is missing

Trig. Ratios

SOH CAH TOA

right angled \triangle

2 sides + 1 angle \rightarrow 1 is missing

Sine Law

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

* can be
flipped

non-right angle \triangle

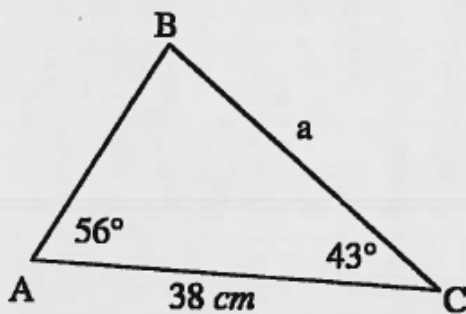
2 set of sides and angles
across from each
other \rightarrow 1 is missing

Cosine Law

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

non-right angle \triangle

3 sides + 1 angle \rightarrow 1 is
missing

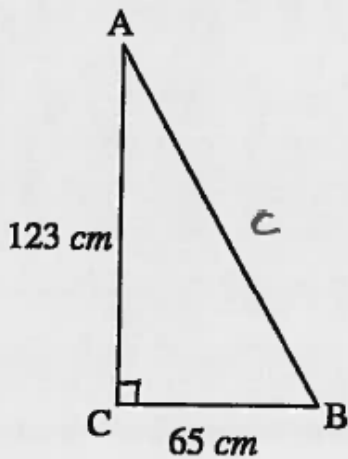
Example 1:

Find the missing
variables.

$$\frac{38}{\sin 81^\circ} = \frac{a}{\sin 56^\circ}$$

$$\frac{38}{\sin 81^\circ} (\sin 56^\circ) = a$$

$$31.9 = a$$

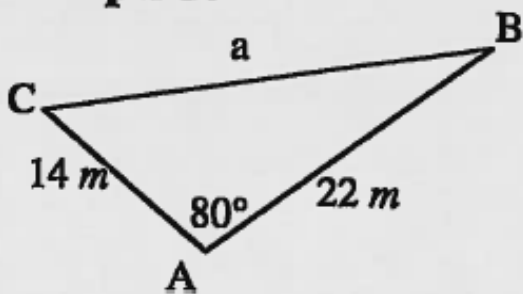
Example 2:

$$a^2 + b^2 = c^2$$

$$65^2 + 123^2 = c^2$$

$$19354 = c^2$$

$$139.1 = c$$

Example 3:

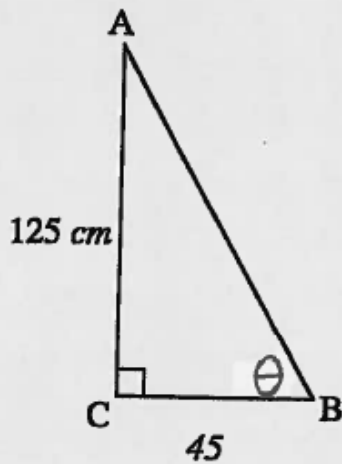
$$a^2 = c^2 + b^2 - 2cb \cos A$$

$$= 14^2 + 22^2 - 2(14)(22) \cos 80^\circ$$

$$H_i = 573.03$$

⊗

$$a = 23.94$$

Example 4:

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

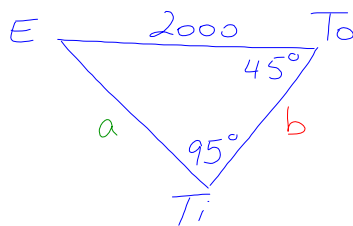
$$\tan \theta = \frac{125}{45}$$

$$\tan \theta = 2.77$$

$$\theta = 70^\circ$$

Problem 1:

David wants to go to Toronto from Edmonton, but he took the wrong road and ended up in Timmins instead. Upon realizing his directions mistake, David drove from Timmins to Toronto. If the angle at Toronto is 45° , the angle at Timmins is 95° , and the distance from Edmonton to Toronto is 2000 km, how much further did David drive than necessary?



$$\frac{a}{\sin 45^\circ} = \frac{2000}{\sin 95^\circ} \quad \frac{b}{\sin 40^\circ} = \frac{2000}{\sin 95^\circ}$$

$$a = 1419.62$$

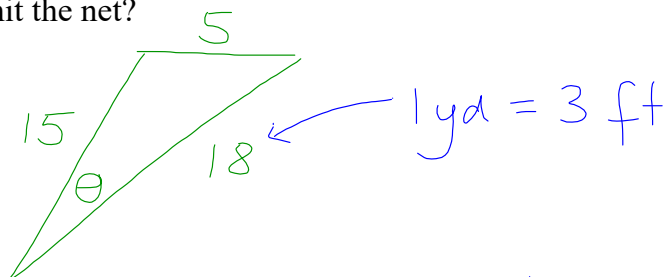
$$b = 1290.5$$

$$\begin{aligned} \text{Total} &= 1419.62 + 1290.5 \\ &= 2710.11 \end{aligned}$$

$$\begin{aligned} \text{Extra} &= 2710.11 - 2000 \\ &= 710.11 \quad \therefore 710 \text{ km} \end{aligned}$$

Problem 2:

Jill and her friends built an outdoor hockey rink. Their hockey goal line is 5 feet wide. Jill shoots a puck from a point where the puck is 5 yards from one goal post and 6 yards from the other goal post. Within what angle must Jill make her shoot to hit the net?



$$5^2 = 15^2 + 18^2 - 2(15)(18) \cos \theta$$

$$25 = 225 + 324 - 540 \cos \theta$$

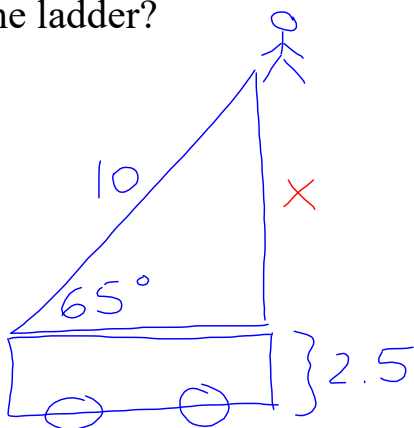
$$-524 = -540 \cos \theta$$

$$0.97 = \cos \theta$$

$$14^\circ = \theta$$

Problem 3:

A fireman's ladder is inclined at an angle of 65° . The ladder is 10 meters long and is on top of a truck that is 2.5 meters high. How high is the fireman from the ground when he is at the top of the ladder?



$$\sin 65^\circ = \frac{x}{10}$$

$$9.06 = x$$

$$\text{Total} = 9.06 + 2.5$$

$$= 11.56$$

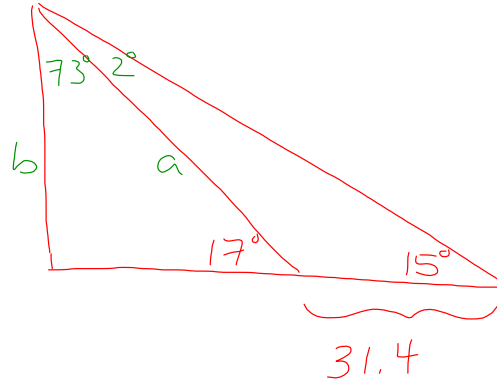
$$\therefore 11.56 \text{ m high}$$

Problem 4:

Jessica stood at a distance admiring a magnificent Douglas Fir. Jessica measured the angle of elevation to the top of the tree and found it to be 15° . Jessica then walked 31.4 feet closer to the tree. This time the angle of elevation to the top of the tree was 17° . Calculate the height of the tree.

$$\frac{a}{\sin 15^\circ} = \frac{31.4}{\sin 2^\circ}$$

$$a = 232.87$$



$$\frac{b}{\sin 17^\circ} = \frac{232.9}{\sin 17^\circ}$$

$$68.08 = b$$

\therefore the tree is 68m tall

Finish any **BOARD** questions that you didn't have time to do in class.