

Date: _____

Today's Learning Goal(s):

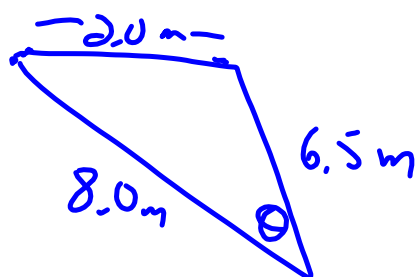
By the end of the class, I will be able to:

- a) solve three dimensional problems using trigonometry.

Last day's work: pp. 325-327 #1b, 2b, 3bc, 4ac, 5, 6, 8 [12,14]

p. 326 #5

5. The posts of a hockey goal are 2.0 m apart. A player attempts to score by shooting the puck along the ice from a point 6.5 m from one post and 8.0 m from the other. Within what angle θ must the shot be made? Round your answer to the nearest degree.



$$\cos \theta = \frac{8^2 + 6.5^2 - 2^2}{2(8)(6.5)}$$

$$\theta = \cos^{-1} \left(\frac{8^2 + 6.5^2 - 2^2}{2(8)(6.5)} \right)$$

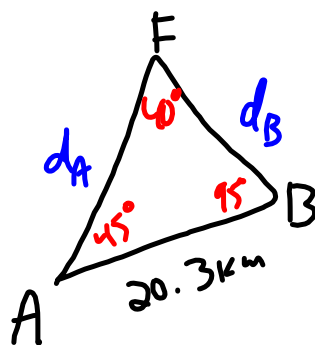
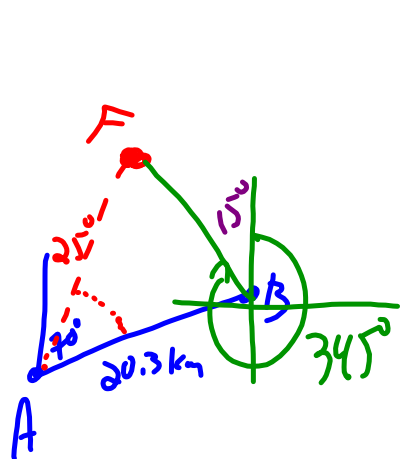
$$= \cos^{-1} \left(\frac{102.25}{104} \right)$$

$$\approx 10.5^\circ$$

\therefore the puck must be shot within 11° .

p. 327 #8

8. Two forest fire towers, A and B , are 20.3 km apart. From tower A , the bearing of tower B is 70° . The ranger in each tower observes a fire and radios the bearing of the fire from the tower. The bearing from tower A is 25° and from tower B is 345° . How far, to the nearest tenth of a kilometre, is the fire from each tower?

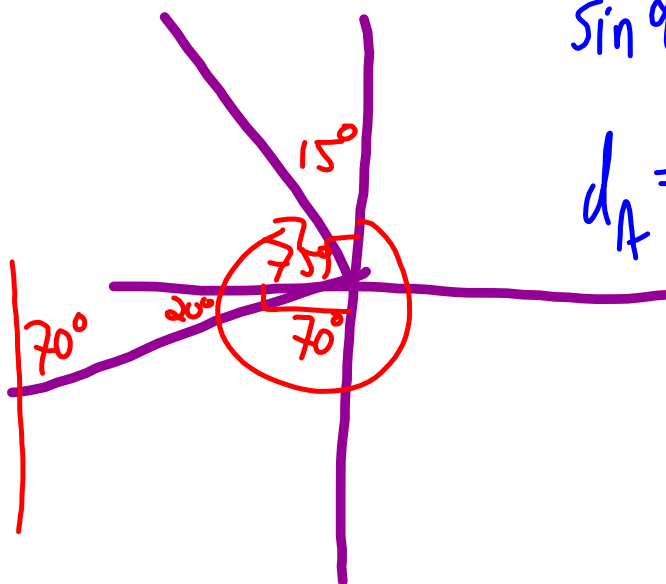


$$\frac{d_A}{\sin 95^\circ} = \frac{20.3}{\sin 40^\circ}$$

$$d_A = 31.5 \text{ km}$$

$$\frac{d_B}{\sin 45^\circ} = \frac{20.3}{\sin 40^\circ}$$

$$d_B = 22.3 \text{ km}$$



5.8 Solving 3-Dimensional Problems Using Trigonometry

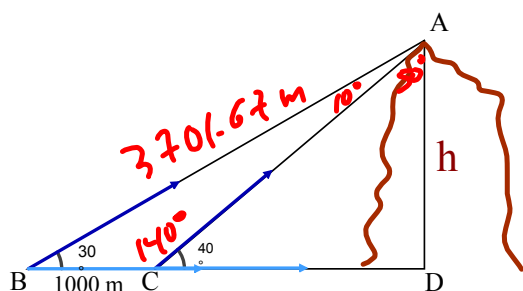
Success Criteria:

Date: _____

- sketch a diagram
- ask: **Is it a Right Triangle?**
 - » If yes, use SOH CAH TOA
- ask: **Is there an Opposite Pair?**
 - » If yes, use Sine Law (don't forget the ambiguous case!)
- ask: **Is there a contained angle, or all 3 sides given?**
 - » If yes, use Cosine Law
 - » Are you finding a side or an angle?
- sub in the numbers, and isolate the variable
- use your calculator to solve
- give a concluding statement
- ensure you have answered the question asked

Ex. 1

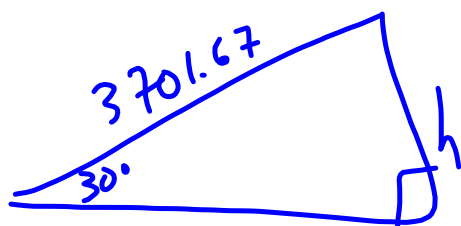
To determine the height of a hill, you measure the angle of elevation of the top to be 30° . You then move 1000 m closer and find the angle of elevation to be 40° . Calculate the height of the hill, to the nearest m.



$$\frac{BA}{\sin 140^\circ} = \frac{1000}{\sin 10^\circ}$$

$$BA = \sin 140^\circ \times \frac{1000}{\sin 10^\circ}$$

$$\approx 3701.67$$



$$\sin 30^\circ = \frac{h}{3701.67}$$

$$h = 3701.67 \sin 30^\circ$$

$$\approx 1850.83$$

$$\approx 1851$$

\therefore the height of the hill is 1851 m.

Ex. 2

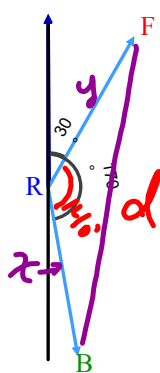
Ranger Rick is in his watch tower 500 m above a valley floor.

He spots "smoke" on a bearing of 030° (N 30° E). The angle of depression is 12° .

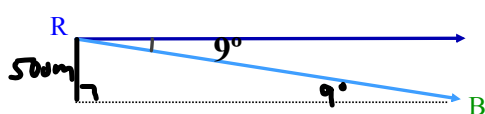
Fireman Bob is on a bearing of 170° (S 10° E) and his angle of depression is 9° .

How far, to the nearest m, is Fireman Bob from the fire?

From Above

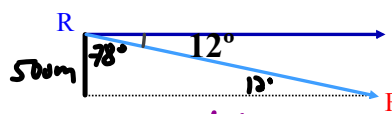


From Ground Level



$$\tan 9^\circ = \frac{500}{x}$$

$$x = \frac{500}{\tan 9^\circ} \\ \approx 3156.87$$



$$\tan 78^\circ = \frac{y}{500} \\ y = 500 \tan 78^\circ \\ \approx 2352.32$$

$$d^2 = 3156.87^2 + 2352.32^2 - 2(3156.87)(2352.32)\cos 140^\circ$$

$$d \approx 5184.2$$

$$\approx 5184 \text{ m}$$

\therefore Bob is 5184 m from the fire.

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 325-327 #1b, 2b, 3bc, 4ac, 5, 6, 8 [12,14]

Today's Homework Practice includes:

pp. 332-335 #3 – 6 [7, 14]