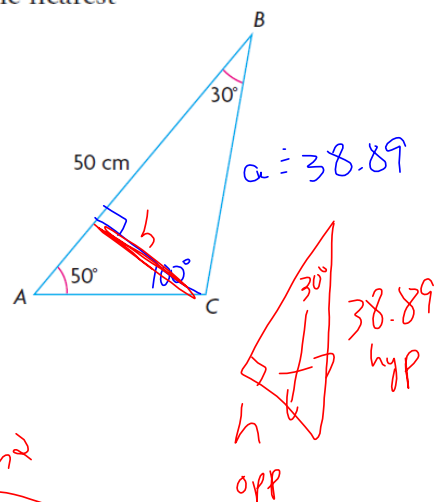


Are there any questions from last day's assigned work you would like to see on the board?

READ p. 308 **AND**
pp. 309-311 # 1 – 10, 12, 13 **AND**
READ p. 313 3, 5, 7

- p. 309 3. Determine the area of $\triangle ABC$, shown at the right, to the nearest square centimetre.



$$A = \frac{1}{2}bh \leftarrow \frac{a}{\sin 50^\circ} = \frac{50}{\sin 100^\circ}$$

$$= \frac{1}{2}(50)(17.45) \quad a \sin 100^\circ = 50 \sin 50^\circ$$

$$= 486.25 \quad a = \frac{50 \sin 50^\circ}{\sin 100^\circ}$$

$$= 486 \text{ cm}^2 \quad = 38.89$$

\therefore the area of $\triangle ABC$ is 486 cm^2

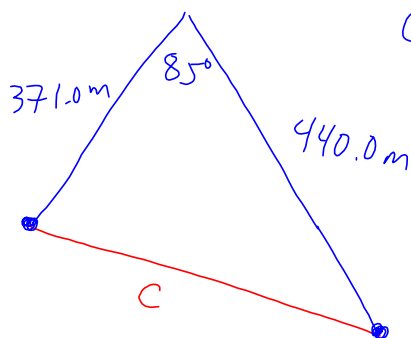
$$\sin 30^\circ = \frac{h}{38.89}$$

$$h = 38.89 \sin 30^\circ$$

$$= 19.445$$

$$= 19.45 \text{ cm}$$

- p. 309 5. To get around an obstacle, a local electrical utility must lay two sections of underground cable that are 371.0 m and 440.0 m long. The two sections meet at an angle of 85° . How much extra cable is necessary due to the obstacle? Round your answer to the nearest tenth of a metre.



C is where the cable "should" have ran.
Instead $371 + 440 = 811 \text{ m}$ of cable was used.

$$\therefore \text{Extra Cable} = 811 - C$$

$$= 811 - 550.26$$

$$= 260.74$$

$$= 260.7 \text{ m}$$

$$C^2 = 371^2 + 440^2 - 2(371)(440)\cos 85^\circ$$

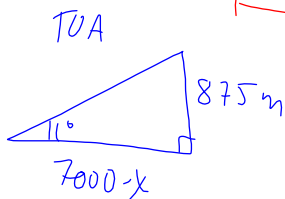
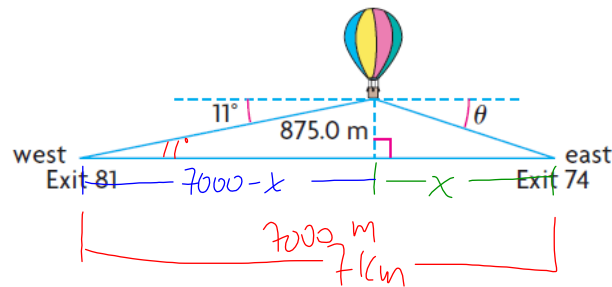
$$C = \sqrt{302786.39}$$

$$= 550.26$$

$\therefore 260.7 \text{ m}$ of extra cable was necessary to go around the obstacle.

p. 309

7. Mike's hot-air balloon is 875.0 m directly above a highway. When he is looking west, the angle of depression to Exit 81 is 11° . The exit numbers on this highway represent the number of kilometres left before the highway ends. What is the angle of depression, to the nearest degree, to Exit 74 in the east?



$$\tan 11^\circ = \frac{875}{7000 - x}$$

$$7000 - x = \frac{875}{\tan 11^\circ}$$

$$7000 - \frac{875}{\tan 11^\circ} = x$$

$$x = 2498.515$$

$$\tan \theta = \frac{875}{x}$$

$$= \frac{875}{2498.515}$$

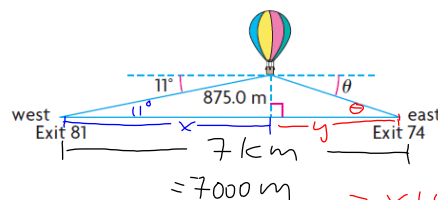
$$\theta = \tan^{-1}\left(\frac{875}{2498.52}\right)$$

$$= 19.30$$

\therefore the angle of depression is 19.3°

OR you can use x and y , instead of x and $7000 - x$.

7. Mike's hot-air balloon is 875.0 m directly above a highway. When he is looking west, the angle of depression to Exit 81 is 11° . The exit numbers on this highway represent the number of kilometres left before the highway ends. What is the angle of depression, to the nearest degree, to Exit 74 in the east?



$$\tan 11^\circ = \frac{875}{x}$$

$$x = \frac{875}{\tan 11^\circ}$$

$$= 4501.48 \text{ m}$$

$$x + y = 7000$$

$$\therefore y = 7000 - 4501.48$$

$$= 2498.52$$

$$\tan \theta = \frac{875}{y}$$

$$= \frac{875}{2498.52}$$

$$= 19.30$$

\therefore the angle of depression is 19.3°

Today's Learning Goal(s):

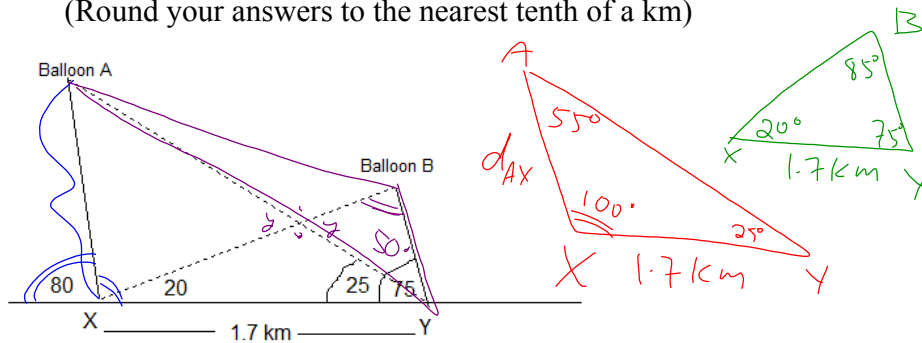
By the end of the class, I will be able to master the concepts presented in this unit.

The learning goals for this unit were:

- 5.0 Identify the opposite, adjacent and hypotenuse side of a right triangle relative to a given angle.
- 5.1 Use primary trig ratios to solve real-life problems.
- 5.2 Solve real-life problems by using combinations of primary trig ratios.
- 5.3 Use the sine law to solve real-life problems.
- 5.4 Use the cosine law to solve real-life problems.
- 5.5 Solve problems involving the primary trig ratios and the sine and cosine laws.

Let's finish Ex.5 from last day:

Ex. 5: Two observers standing at points X and Y are 1.7 km apart. Each person measures angles of elevation to two balloons, A and B, flying overhead as shown. (Round your answers to the nearest tenth of a km)



a) How far is balloon A from point X? From point Y?

$$\frac{d_{AX}}{\sin 25^\circ} = \frac{1.7}{\sin 55^\circ}$$

$$\begin{aligned} \frac{ax}{\sin 55^\circ} &= \frac{1.7}{\sin 55^\circ} \\ ax \sin 55^\circ &= 1.7 \sin 25^\circ \\ ax &= \frac{1.7 \sin 25^\circ}{\sin 55^\circ} \\ &\approx 0.877 \\ &\approx 0.9 \end{aligned}$$

∴ balloon A is 0.9 km from X

$$\begin{aligned} \frac{ay}{\sin 100^\circ} &= \frac{1.7}{\sin 55^\circ} \\ ay &= \frac{1.7 \sin 100^\circ}{\sin 55^\circ} \\ &\approx 2.04 \\ &\approx 2.0 \end{aligned}$$

∴ balloon A is 2.0 km from Y

b) How far is balloon B from point X? From point Y?

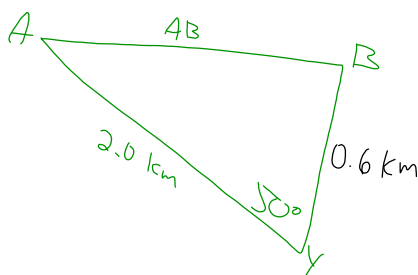
$$\begin{aligned} \frac{BX}{\sin 75^\circ} &= \frac{1.7}{\sin 85^\circ} \\ BX &= \frac{1.7 \sin 75^\circ}{\sin 85^\circ} \\ &\approx 1.64 \\ &\approx 1.6 \end{aligned}$$

∴ balloon B is 1.6 km from X

$$\begin{aligned} \frac{BY}{\sin 20^\circ} &= \frac{1.7}{\sin 85^\circ} \\ BY &= \frac{1.7 \sin 20^\circ}{\sin 85^\circ} \\ &\approx 0.58 \\ &\approx 0.6 \end{aligned}$$

∴ balloon B is 0.6 km from Y

c) How far apart are balloons A and B?



$$\begin{aligned} AB^2 &= 2.0^2 + 0.6^2 - 2(2.0)(0.6)\cos 50^\circ \\ AB &= \sqrt{2.817} \\ &\approx 1.678 \\ &\approx 1.68 \end{aligned}$$

∴ balloons A and B are 1.69 km apart

CHAPTER REVIEW

For right triangles:

Use the primary trig **RATIOS!**

This means SOH CAH TOA

Although both the Sine **Law** and the Cosine **Law** apply to all triangles, we generally only use them with non-right triangles.

This is because when given a right triangle, SOH CAH TOA is faster.

(There is also a case where the LAWS won't work.)

Use the Sine Law if you are given:

-any 2 angles and 1 side

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

Use the Cosine Law if you are given:

-2 sides and the contained angle (SAS)

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

-2 sides, and the angle opposite one of the given sides

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

-all 3 sides (SSS) and no angles

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

Memorize all formulas needed.

Review Quiz questions, correct solutions, and PROPER FORM.

Practice with **YOUR** calculator.

Understand how to round properly:

[lengths to 2 decimal places, and angles to 1 decimal place.]

Memorize all formulas needed.

Review Quiz questions, correct solutions, and PROPER FORM.

Practice with **YOUR** calculator.

Understand how to round properly:

[lengths to 2 decimals places, and angles to 1 decimal place.]

Application questions

Sketch a diagram

(if it's a right triangle, label the sides: hypotenuse, opposite, adjacent)

Understand the reference point, i.e. the surveyor's eye level

Know the difference between the angle of elevation
and angle of depression and how to label it properly.

Today's Assigned Practice:

p. 314 # 1 – 10

p. 316 # 1 – 8