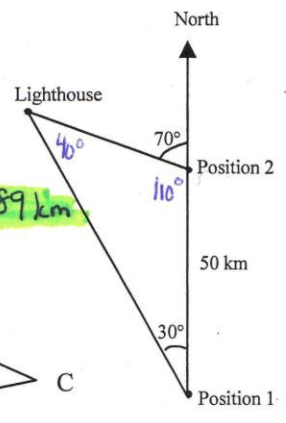


- 1 A ship is going north at 50 km/h. At position 1, the captain can see a lighthouse at a  $30^\circ$  angle on his left. One hour later, at position 2, the captain observes the same lighthouse,

at this time at a  $70^\circ$  angle on his left.  
**What is the distance between position 2 and the lighthouse?**

$$\frac{50}{\sin 40^\circ} = \frac{x}{\sin 30^\circ} \Rightarrow x = 38.89 \text{ km}$$

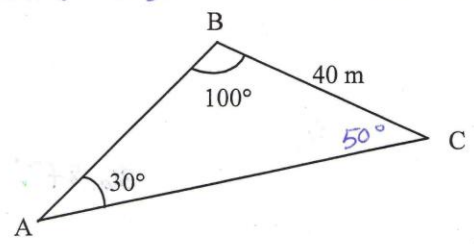


- 2 Three airplanes flying in formation at an air show form a triangle, as shown below.

**What is the distance between plane A and plane C?**

$$\frac{40}{\sin 30^\circ} = \frac{x}{\sin 100^\circ}$$

$$x = 78.78 \text{ m}$$

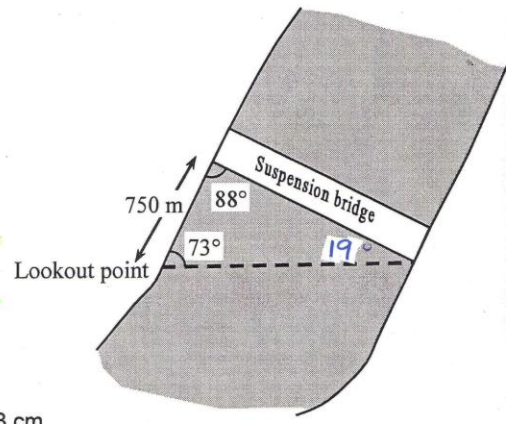


- 3 A suspension bridge is built across a river. A lookout point is 750 m from the bridge. Other measurements are indicated on the figure below.

**What is the length of the suspension bridge?**

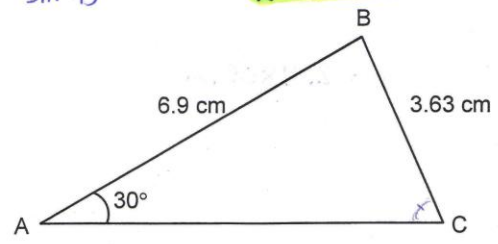
$$\frac{750}{\sin 19^\circ} = \frac{x}{\sin 73^\circ}$$

$$x = 2203 \text{ m}$$



- 4 Given  $\triangle ABC$  below.  
**What is the degree measure of angle C?**

$$\frac{3.63}{\sin 30^\circ} = \frac{6.9}{\sin C}$$



$$\sin C = 0.9504$$

$$\angle C = \sin^{-1}(0.9504)$$

$$\angle C = 71.88^\circ$$

- 5 In triangle QRS on the right:

- $m \angle QSR = 34^\circ$
- $m \overline{QR} = 385 \text{ cm}$
- $m \overline{QS} = 655 \text{ cm}$

**What is the measure of obtuse angle QRS?**

$$\frac{385}{\sin 34^\circ} = \frac{655}{\sin R}$$

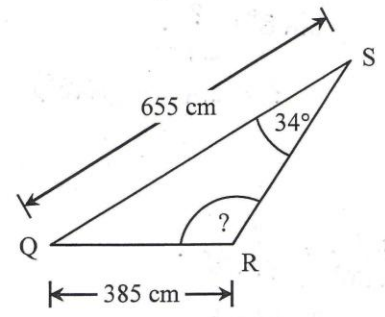
$$\sin R = 0.9514$$

$$\angle R = \sin^{-1}(0.9514)$$

$$\Rightarrow \angle R = 72.06^\circ$$

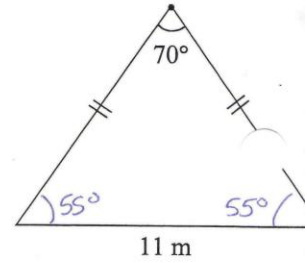
$$\text{obtuse} \Rightarrow \therefore \angle R = 180 - 72.06$$

$$\angle R = 107.94^\circ$$



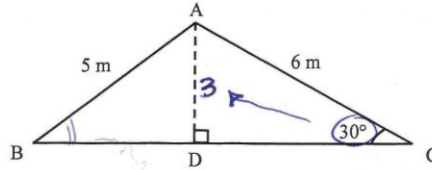
$$\frac{11}{\sin 70^\circ} = \frac{x}{\sin 55^\circ}$$

- 6 Kozy Korner is an A-frame ski chalet that was constructed last summer. It is 11 m wide and has two equal sides that meet at a  $70^\circ$  angle. **What is the length of one of the equal sides?**



$$x = 9.59 \text{ m}$$

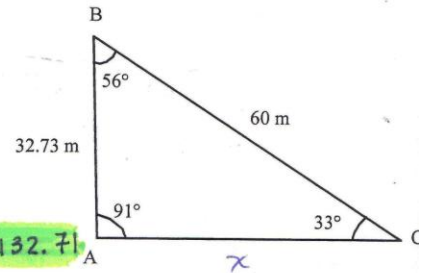
- 7 Given triangle ABC and its height AD: **What is the measure of angle ABC?**



$$\sin B = \frac{3}{5}$$

$$\angle B = \sin^{-1}\left(\frac{3}{5}\right) = 36.87^\circ$$

- 8 A yard is to be fenced. The yard's shape and dimensions are illustrated in the adjacent diagram. The fencing costs \$7.95 per metre, taxes included. **How much will the fence cost?**



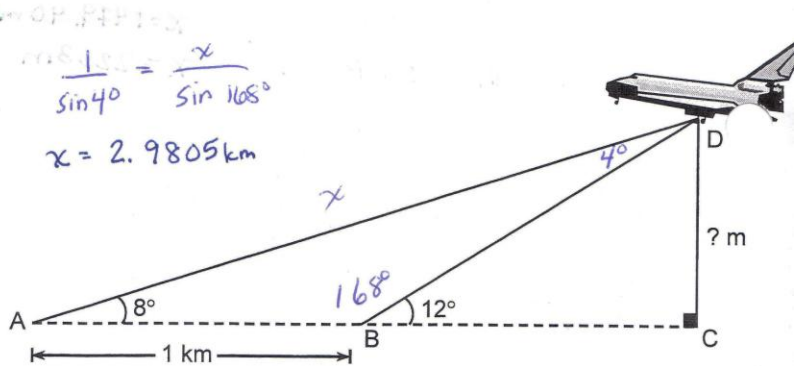
$$\frac{60}{\sin 91^\circ} = \frac{x}{\sin 56^\circ}$$

$$\Rightarrow x = 49.7498 \text{ m}$$

$$P = 142.4798 \text{ m}$$

$$\text{Cost} = 142.4798 \times 7.95 = \$1132.71$$

- 9 A space shuttle activated its landing gear just before landing. At that moment, the radar located at point A measured the angle of elevation of the shuttle to be  $8^\circ$ . The other radar, located at point B, measured the angle of elevation of the shuttle to be  $12^\circ$ . The radars are 1 km apart.



$$\frac{1}{\sin 4^\circ} = \frac{x}{\sin 168^\circ}$$

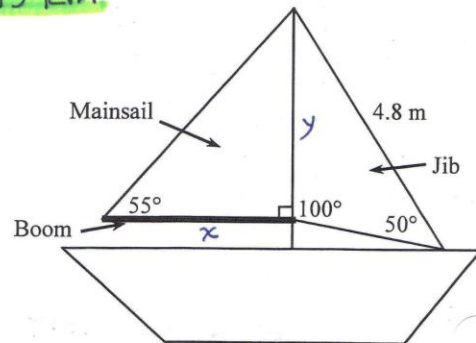
$$x = 2.9805 \text{ km}$$

**What is the height of the shuttle above the ground?**

$$\sin 8^\circ = \frac{?}{2.9805}$$

$$? = 2.9805 (\sin 8^\circ) \Rightarrow ? = 0.415 \text{ km}$$

- 10 Several measures are given on the adjacent diagram of a sailboat. Along the bottom of the mainsail is a pole called the boom. **How many metres long is the boom of this sailboat?**



$$\frac{4.8}{\sin 100^\circ} = \frac{y}{\sin 50^\circ}$$

$$y = 3.7337$$

$$\tan 55^\circ = \frac{3.7337}{x}$$

$$x = \frac{3.7337}{\tan 55^\circ}$$

$$x = 2.61 \text{ m}$$