

Advanced Trigonometry - Lesson 3

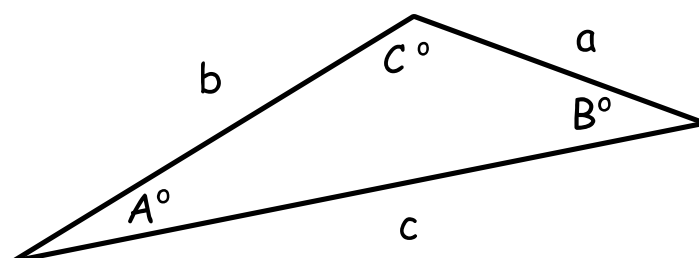
Sine Rule (Length)

LI

- Use the Sine Rule to find a missing length in any triangle.

SC

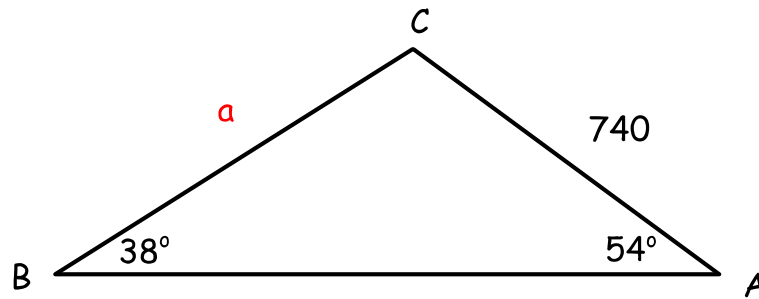
- Use a calculator properly.

Sine Rule

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

Strategy for Finding Missing Length

- Sketch triangle and label **all** sides and angles
- Write down Sine Rule
- Tick the things you know
- Solve for missing length (set calculator to **degrees**)

Example 1Calculate a to 1 d.p. .

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

$$A^\circ = 54^\circ, a =$$

$$B^\circ = 38^\circ, b = 740$$

$$C^\circ =, c =$$

$$\frac{a}{\sin A^\circ} = \frac{b}{\sin B^\circ}$$

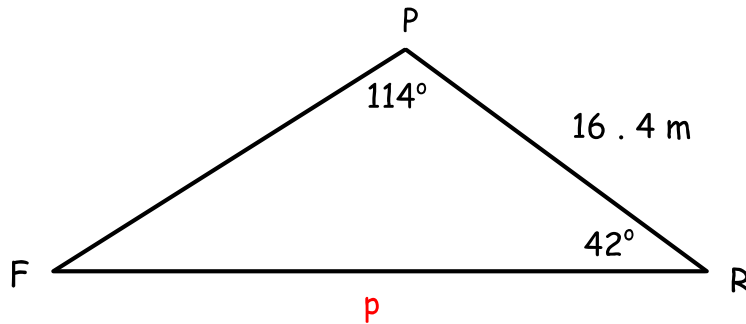
$$\frac{a}{\sin 54^\circ} = \frac{740}{\sin 38^\circ}$$

$$a = \frac{(740 \times \sin 54^\circ)}{\sin 38^\circ}$$

$$a = 972.4$$

Example 2

Calculate p to the nearest centimetre .



$$\frac{p}{\sin P^\circ} = \frac{f}{\sin F^\circ} = \frac{r}{\sin R^\circ}$$

$$P^\circ = 114^\circ, \quad p =$$

$$F^\circ = 24^\circ, \quad f = 16.4 \text{ m}$$

$$R^\circ = 42^\circ, \quad r =$$

$$\frac{p}{\sin P^\circ} = \frac{f}{\sin F^\circ}$$

$$\frac{p}{\sin 114^\circ} = \frac{16.4}{\sin 24^\circ}$$

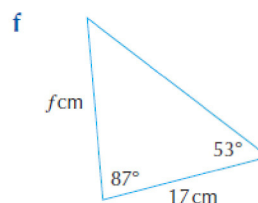
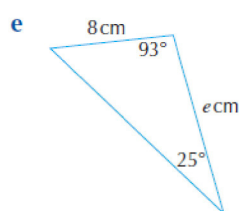
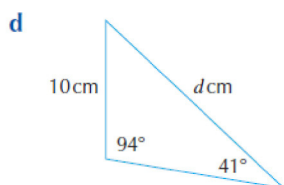
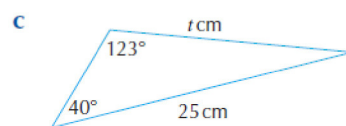
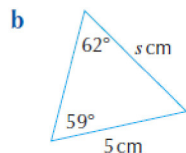
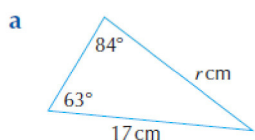
$$p = \frac{(16.4 \times \sin 114^\circ)}{\sin 24^\circ}$$

$$p = 36.835 \dots$$

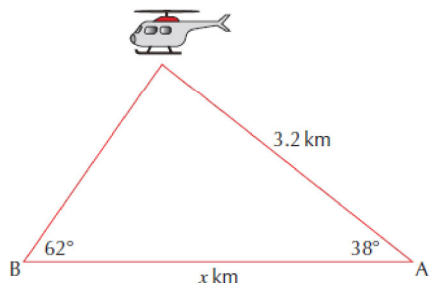
$$p = 36.84 \text{ m}$$

Questions

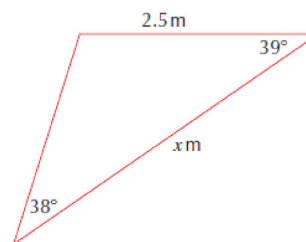
1 Find the size of the missing side in each triangle. Give your answers to 3 significant figures.



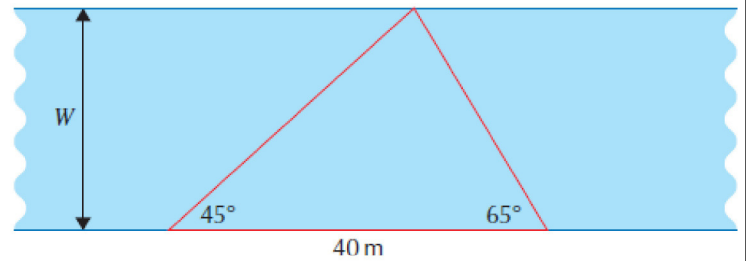
4 A helicopter flies from Helipad A. It then needs to land at Helipad B. How far apart are the two helipads? Give your answer to 3 significant figures.



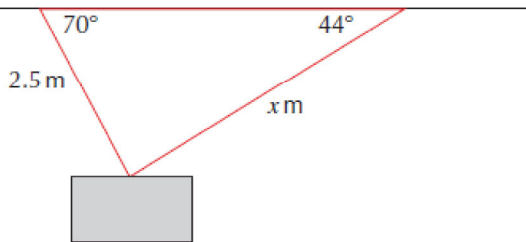
6 A metal support for a roof at a stadium is shown. Calculate the size of the beam labelled x to 2 significant figures.



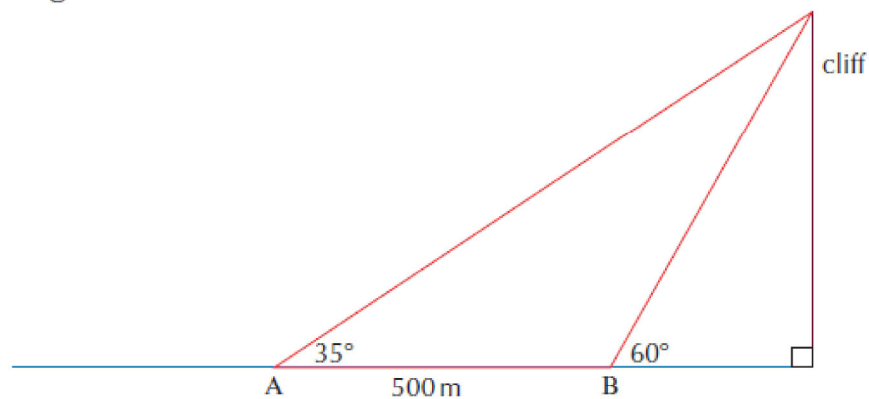
- 7 Two surveyors measure the distance across a river in order to build a bridge. They measure the information shown. Calculate the width W of the river giving your answer to 3 significant figures.



- 8 Jane uses a pulley system to lift a weight. The pulley is mounted to the ceiling as shown.
- Calculate the length of rope marked x giving your answer to 2 significant figures.
 - The weight has to be attached to the ceiling. What distance must the weight be lifted?



- 10 Two ships A and B are 500 m apart. Their navigators measure the angles from the sea level to the top of the cliff. Find the height of the cliff. Give your answer to 3 significant figures.



Answers

1	a	15.2 cm	4	3.57 km
	b	4.85 cm	6	4 m
	c	19.2 cm	7	27.3 m
	d	15.2 cm	8	a 3.4 m
	e	16.7 cm		b 2.4 m
	f	21.1 cm	10	588 m