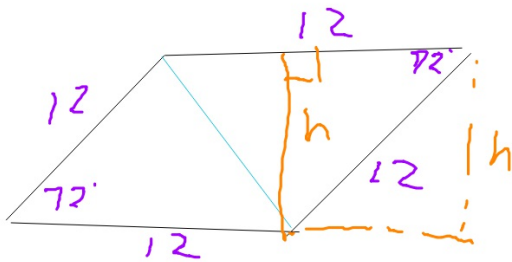


IB Math Studies 2

BELL WORK

- 1) A rhombus has sides of length 12 cm and an angle of 72° . Find its area.

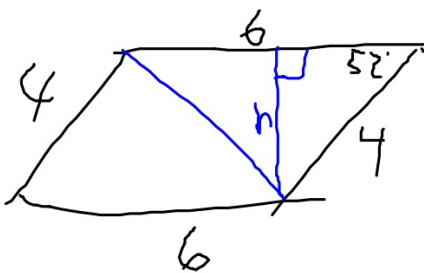


$$A = \left(\frac{1}{2} bc \sin A \right)$$

$$12 \cdot 12 \cdot \sin 72$$

$$= 137 \text{ cm}^2$$

- 2) A parallelogram has adjacent sides of length 4 cm and 6 cm. If the included angle measures 52° , find the area of the parallelogram.



$$A = \left(\frac{1}{2} (6)(4) \sin 52 \right) \cdot 2$$

Chapter 15

Trigonometry

- A** Labelling right angled triangles
- B** The trigonometric ratios
- C** Using trigonometry in geometric figures
- D** Problem solving using trigonometry
- E** 3-dimensional problem solving
- F** Areas of triangles
- G** The cosine rule
- H** The sine rule
- I** Using the sine and cosine rules
- J** The ambiguous case (Extension)

Syllabus reference: 5.2, 5.3, 5.4

An important note about all that "opp-adj-hyp" "SOH CAH TOA" stuff...

IT ***ONLY*** WORKS WITH **RIGHT TRIANGLES!**

* If you don't have a right angle, there is no hypotenuse. Don't try to make one.

G**THE COSINE RULE**

The **cosine rule** involves the sides and angles of any triangle.

If you know two sides and the included angle, you can find the third side.

If you know all three sides, you can find an angle.

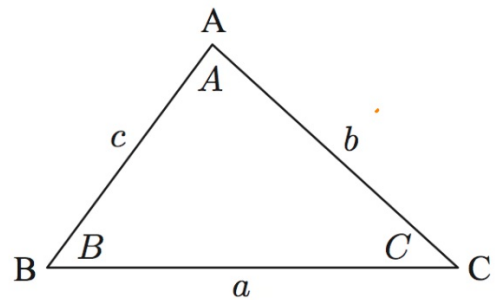
$$a^2 = b^2 + c^2 - 2bc \cos A$$

or

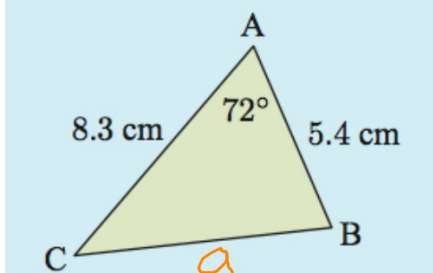
$$b^2 = a^2 + c^2 - 2ac \cos B$$

or

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



Find the length BC:



$$a^2 = 8.3^2 + 5.4^2 - (2(8.3)(5.4)\cos(72))$$

$$\sqrt{a^2} = \sqrt{70.3497}$$

$$a = 8.39 \text{ cm}$$

In triangle ABC, AB = 7 cm, BC = 5 cm, and CA = 8 cm.
Find the measure of angle BCA.

$$7^2 = 8^2 + 5^2 - 2(8)(5)\cos C$$

$$49 = 64 + 25 - 80\cos C$$

$$\begin{array}{r} -64 \\ -25 \\ \hline \end{array}$$

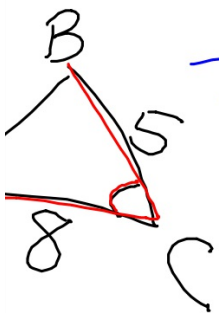
$$-40 = -80\cos C$$

$$\frac{-40}{-80} = \frac{-80\cos C}{-80}$$

$$\frac{1}{2} = \cos C$$

$$\cos^{-1}\left(\frac{1}{2}\right) =$$

$$60^\circ$$

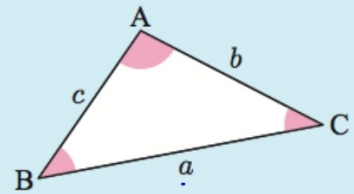


H

THE SINE RULE

In any triangle ABC with sides a , b , and c units in length, and opposite angles A , B , and C respectively,

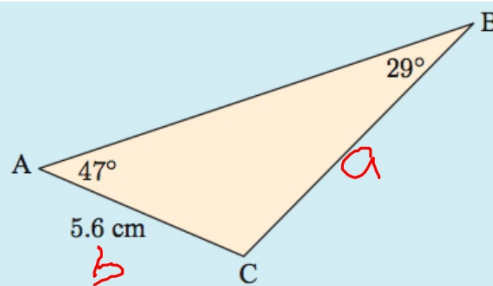
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \quad \text{or} \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}.$$



The sine rule is used to solve problems involving triangles, given:

- **two angles and one side**
- **two sides and a non-included angle.**

Find the length of BC correct to three significant figures.



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

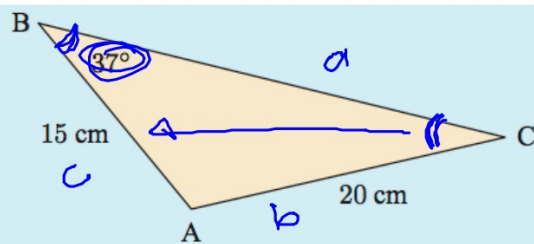
$$\frac{\sin 47}{a} = \frac{\sin 29}{5.6}$$

$$\frac{5.6 \cdot \sin 47}{\sin 29} = \frac{a \cdot \sin 29}{\sin 29}$$

$$8.45 = a$$

cm

Determine the size of $\hat{A}CB$ correct to 3 significant figures.



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

$$\frac{\sin 37}{20} = \frac{\sin C}{15}$$

$$\frac{15(\sin 37)}{20} = 20$$

$$\angle ACB = 26.8^\circ$$

Assignment:

15 F # 1, 2, 6

15 G # 1, 4, 6

15 H.1 # 3

15 H.2 # 3