

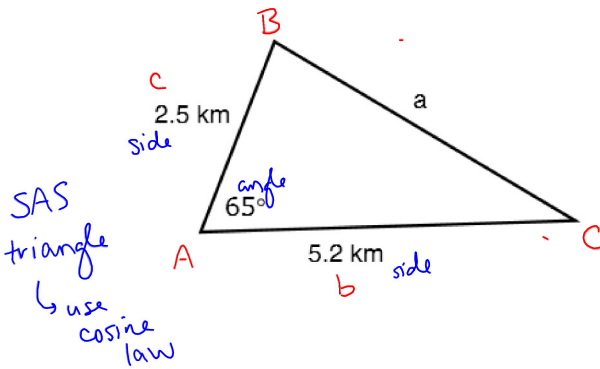
Cosine Law - Determining a Side

$a^2 = b^2 + c^2 - (2bc \cos A)$ $2 \times b \times c \times \cos A$
side you want matching "book ends" can be written

$b^2 = a^2 + c^2 - (2ac \cos B)$
 $c^2 = a^2 + b^2 - (2ab \cos C)$

Example 1

Determine the size of the unknown side, to the nearest tenth of a kilometre.



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

$$a^2 = (5.2)^2 + (2.5)^2 - 2(5.2)(2.5) \cos 65^\circ$$

$$a^2 = 22.3019 \dots$$

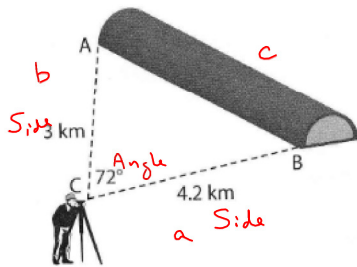
$$a = \sqrt{22.3019 \dots}$$

$$a = 4.7 \text{ km}$$

Example 2

A tunnel for a new highway is built in a straight line through a mountain in Northern BC. To determine the length of the tunnel, surveyors choose a point where they can see both ends of the tunnel. Their measurements are shown below.

Determine the length of the tunnel, to the nearest tenth of a kilometre.



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

$$c^2 = (4.2)^2 + 3^2 - 2(4.2)(3) \cos 72^\circ$$

$$c^2 = 18.852 \dots$$

$$c = 4.3 \text{ km}$$

lesson 4 - Cosine Law.notebook

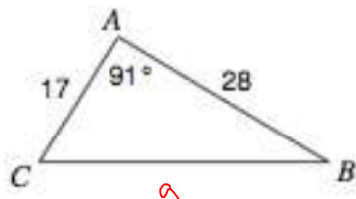
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Lesson 4

Cosine Law

Example 3 - Your Turn!!!

Determine the length of side a. Round to 2 decimal places.



$$a^2 = 17^2 + 28^2 - 2(17)(28)\cos 91^\circ$$
$$a^2 = 1089.614\dots$$
$$a = 33.01$$

- 1) 5.42 cm
- 2) 8.55 cm
- 3) 5.80 km

✓

Trigonometry