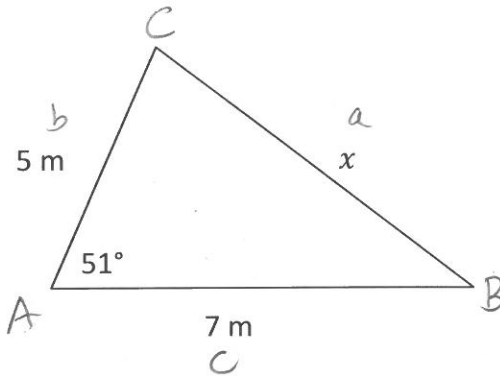


Using the Law of Cosines to find the Length of an Unknown Side

Example 1:

Find the length of side x .

Given
 $\angle A = 51^\circ$
 $b = 5 \text{ m}$
 $c = 7 \text{ m}$
Find
 side a



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

$$a^2 = (5^2 + 7^2) - (2 \times 5 \times 7 \cos 51^\circ)$$

$$a^2 = (25 + 49) - (70 \cos 51)$$

$$a^2 = (74) - (44.0524)$$

$$a^2 = 74 - 44$$

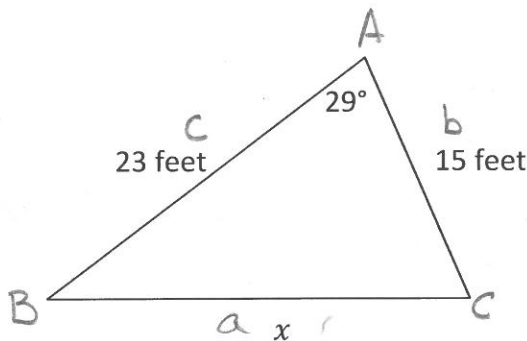
$$a^2 = 29.94757263$$

$$a = \sqrt{29.94757263}$$

$$x = 5.47 \text{ m}$$

Example 2

Find the length of side x .



④ substitute the given values into \rightarrow

① Label the angles and sides

② Given $\angle A = 29^\circ$
 $c = 23 \text{ ft}$
 $b = 15 \text{ ft}$
Find side $a (x)$

③ using the law of cosines

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

$$a^2 = 15^2 + 23^2 - 2(15 \times 23) \cos 29^\circ$$

$$a^2 = 225 + 529 - 2(345) \cos 29^\circ$$

$$a^2 = (754) - (690 \cos 29^\circ)$$

$$a = \sqrt{(754) - (690 \cos 29^\circ)}$$

$$a = \sqrt{150.5124621}$$

$$a = 12.27 \text{ feet}$$