

Cosine Law

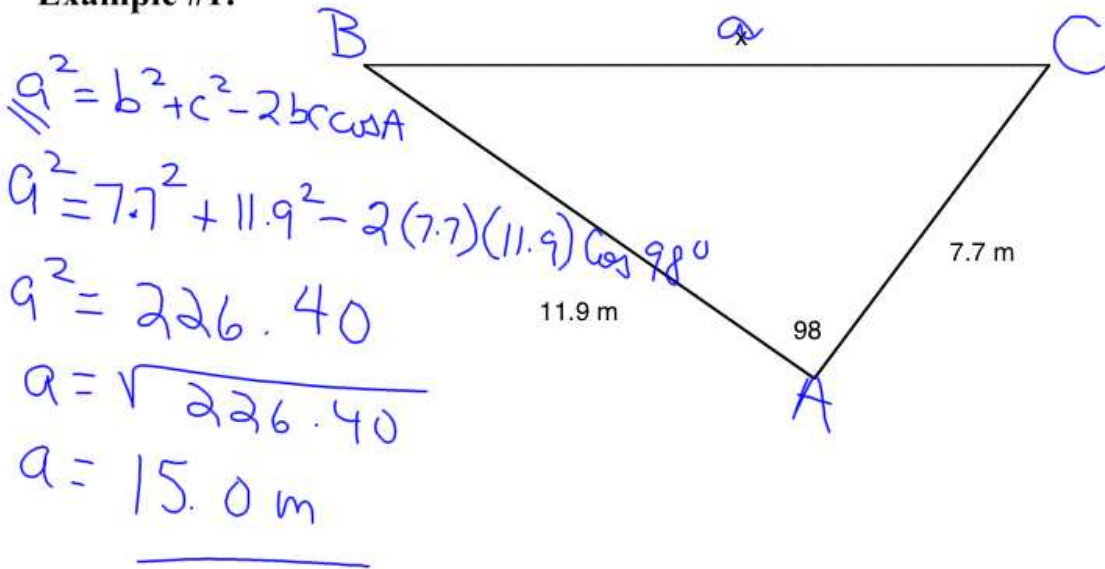
$$a^2 = b^2 + c^2 - 2bc \cos(A)$$

→ find a side

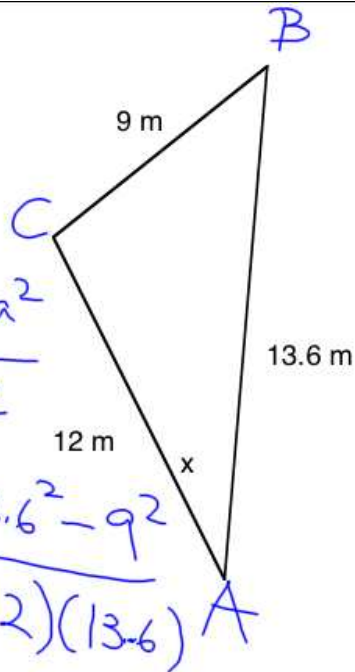
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

→ find an angle

Example #1:



Example #2:



$$\underline{\underline{\cos A = \frac{b^2 + c^2 - a^2}{2bc}}}$$

$$\cos A = \frac{12^2 + 13.6^2 - 9^2}{2(12)(13.6)}$$

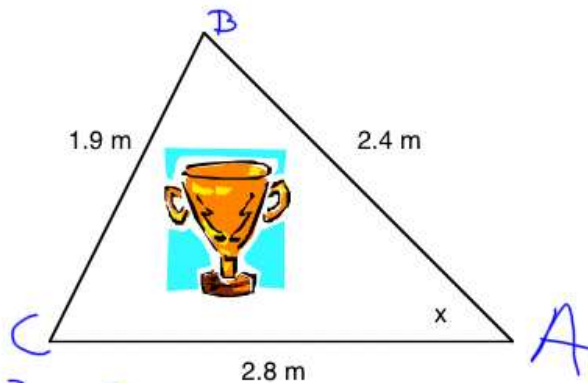
$$\cos A = \frac{247.96}{326.4}$$

$$\rightarrow A = \cos^{-1} \left(\frac{247.96}{326.4} \right)$$

$A = 41^\circ$

Example #3:

To guard a valuable trophy on display the staff at a museum roped off a triangular area and installed a security camera as shown below. If the security camera must rotate continually between the two longest ropes what angle must it rotate through?



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

$$\cos A = \frac{2.8^2 + 2.4^2 - 1.9^2}{2(2.8)(2.4)}$$

$$\cos A = \frac{9.99}{13.44}$$

$$A = \cos^{-1}\left(\frac{9.99}{13.44}\right) = \underline{42^\circ}$$

1-6

10-12