

# U2D9\_T Cosine Law

Sunday, March 4, 2018 12:53 PM



U2D9\_T  
Cosine Law

## U2D9: Cosine Law

### Cosine Law:

The Cosine Law can be used to solve for an unknown side, if you are given two sides and a contained angle:

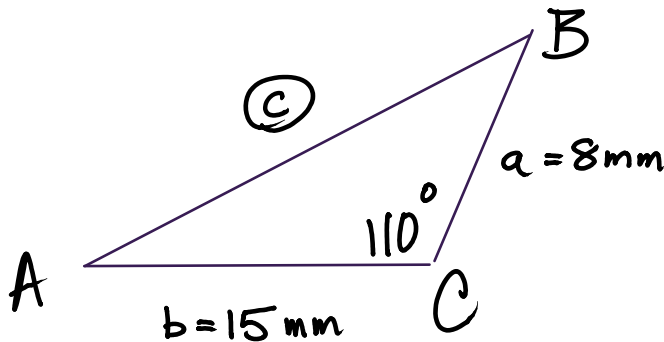
$$a^2 = b^2 + c^2 - 2bc \cos A$$

It can also be re-arranged to solve for an unknown angle:

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

**Example 1:** Determine the length of side 'c' to the nearest tenth.

Given  $\triangle ABC$ ,  $C = 110^\circ$ ,  $b = 15 \text{ mm}$ ,  $a = 8 \text{ mm}$



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

$$c^2 = 8^2 + 15^2 - 2(8)(15)\cos 110^\circ$$

$$c^2 = 371.0848\dots$$

$$c = \sqrt{371.0848\dots}$$

$$c = 19.3 \text{ mm}$$

$$\cos^{-1}((e^2 + f^2 - d^2) \div (2 \times e \times f))$$

**Example 2:** Determine the value of angle D to the nearest degree.

Given  $\triangle DEF$ ,  $d = 10$  cm,  $e = 15$  cm,  $f = 17$  cm

$$\cos D = \frac{(e^2 + f^2 - d^2)}{(2ef)}$$

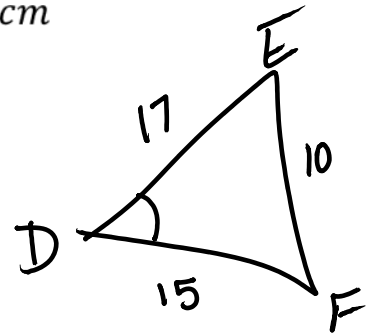
$$\cos D = \frac{15^2 + 17^2 - 10^2}{2(15)(17)}$$

$$\cos D = \frac{414}{510}$$

$$D = \cos^{-1}(0.81176\dots)$$

$$D = 35.7$$

$$D \doteq 36^\circ$$



U2D9 Practice: page 110 # 1a, 3, 4a, 5, 6, 7a