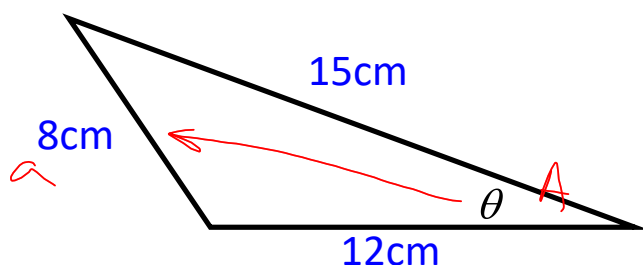




1.8 Find Angles Using the Cosine Law



Can you find the unknown angle using Cosine Law???

Try it!

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

$$8^2 = 15^2 + 12^2 - 2(15)(12) \cos \theta$$

$$64 = 369 - 360 \cos \theta$$

$$64 - 369 = -360 \cos \theta$$

$$-305 = -360 \cos \theta$$

$$\frac{-305}{-360} = \cos \theta$$

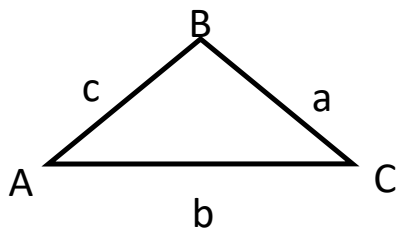
$$\theta = \cos^{-1} \left(\frac{-305}{-360} \right)$$

$$= 32^\circ$$

$$\left\{ \begin{array}{l} -305 = -360x \end{array} \right.$$



Cosine Law: In $\triangle ABC$



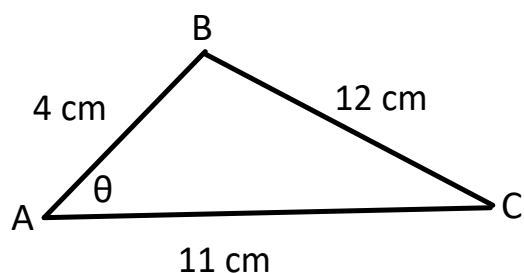
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

****use to find an angle****

See the pattern:

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

Example:



$$\cos \theta = \frac{11^2 + 4^2 - 12^2}{2(11)(4)}$$

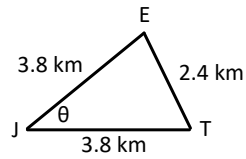
$$= \frac{-7}{88}$$

$$\theta = \cos^{-1}\left(\frac{-7}{88}\right)$$

$$= 95^\circ$$



1) Solve for the unknown.

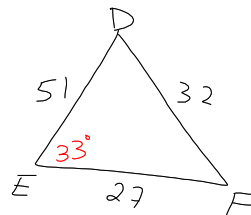


$$\cos \theta = \frac{3.8^2 + 3.8^2 - 2.4^2}{2(3.8)(3.8)}$$

$$= \frac{23.12}{28.88}$$

$$\theta = \cos^{-1}\left(\frac{23.12}{28.88}\right)$$

$$= 37^\circ$$

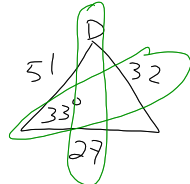
2) Solve $\triangle DEF$ if $d = 27$ m, $e = 32$ m, $f = 51$ m.

$$\cos(E) = \frac{51^2 + 27^2 - 32^2}{2(51)(27)}$$

$$= \frac{2306}{2754}$$

$$E = \cos^{-1}\left(\frac{2306}{2754}\right)$$

$$E = 33^\circ$$



$$\frac{\sin D}{27} = \frac{\sin 33}{32}$$

$$\sin D = 27 \cdot \frac{\sin 33}{32}$$

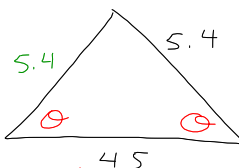
$$D = \sin^{-1}\left(\frac{27 \cdot \sin 33}{32}\right)$$

$$D = 27^\circ$$

$$F = 180 - 33 - 27$$

$$F = 120^\circ$$

3) Your parents agree to build you a new room in the attic. It will be a triangular shape like the one shown. The contractor needs to know all the angles in the triangle to build this special room. Find the angles of your new room.



- Find θ using cosine law
- Use sum of angles for last angle



Practice!



Set 1: p. 418#2ac,3ab,5a,8

Set 2: p. 418#3b,5a,8,9,11,16

