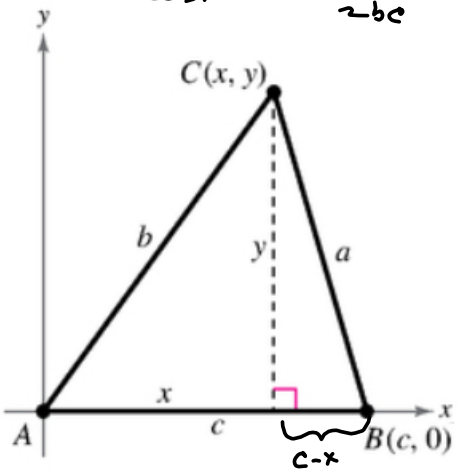
Section 3.2 Law of Cosines

Law of Cosines Link to Proof - Click Here!

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

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

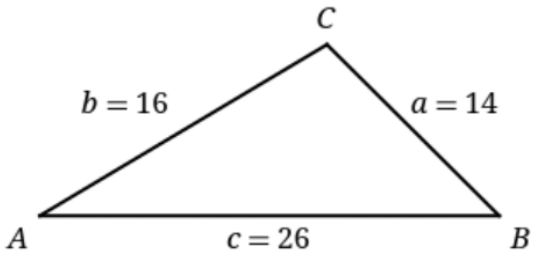
$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$ (To find angles)



Let's us do SSS questions.

This will be the foundation for finding angles between vectors, projections of one vector onto another (Section 3.4)

Solve the triangle. Round to 2 decimal places.



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

$= \frac{16^2+26^2-14^2}{2(16)(26)}$

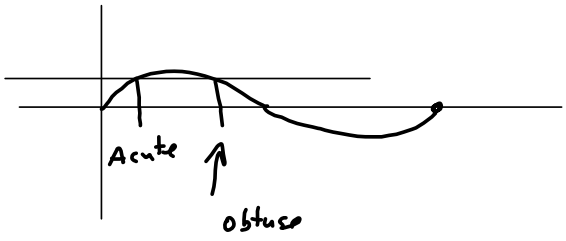
$=$

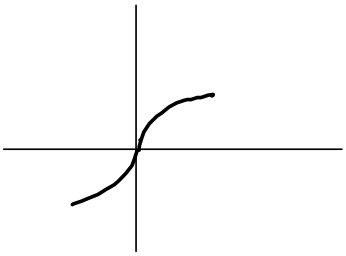
$$\frac{\left(16^2+26^2-14^2\right)}{2\cdot 16\cdot 26} = 0.884615384615$$

$$\arccos\left(0.884615384615\right) = 27.7957724961$$

$\approx$ $A \approx 27.80^\circ$

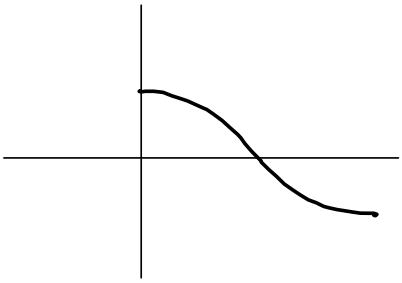
Recall: Law of Sines only gives you acute solutions. You need to use your thinking cap to know whether you're looking for an acute or an obtuse angle.





Restricted Cosine is defined on $[0, \pi] = [0, 180^\circ]$

arccosine works w/o thinking cap for these.



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

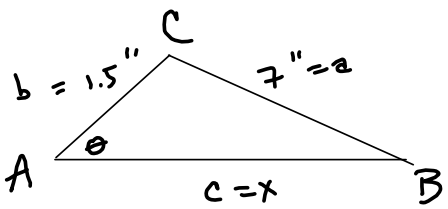
$$\cos B = \frac{a^2+c^2-b^2}{2ac}$$

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

3.2 #12 from Notes on harryzaims.com

3.2 #12 Video isn't there, dadgummit!

Use the Law of Cosines giving the relationship between *x* and theta.



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

$7^2 = 1.5^2 + x^2 - 2(1.5)x\cos\theta$

$49 = 2.25 + x^2 - 3x\cos\theta$

$x^2 - 3x\cos\theta - 46.75 = 0$

$ax^2 + bx + c = 0$ (Different a, b, c)

$a = 1, b = -3\cos\theta, c = -46.75$

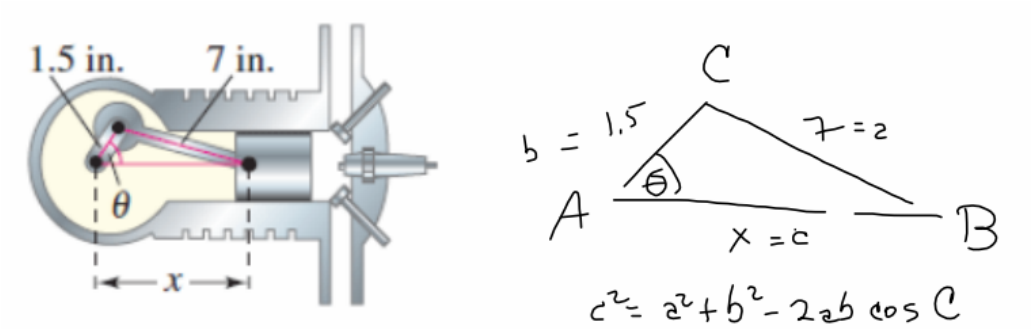
$b^2 - 4ac = 9\cos^2\theta - 4(1)(-46.75)$

$= 9\cos^2\theta + 187$

only positive.

$\Rightarrow x = \dfrac{-3\cos\theta \pm \sqrt{9\cos^2\theta + 187}}{2}$ (6)

+



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