7-3 Law of Cosines

Objective:

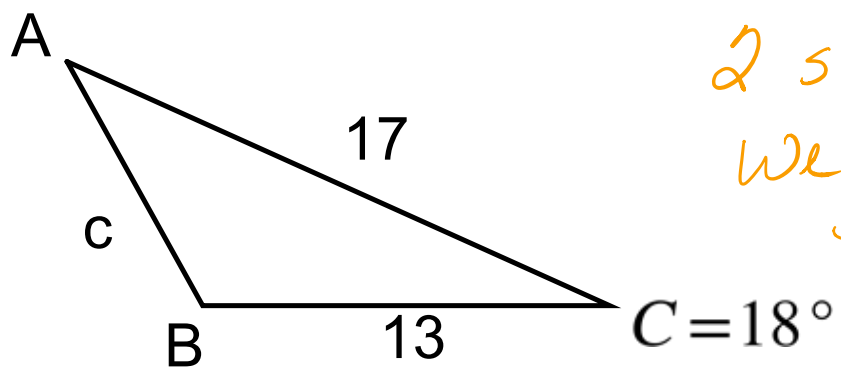
7-3a: I can solve a triangle using the Law of Cosines.

How do we solve a triangle like this...

What do we know?

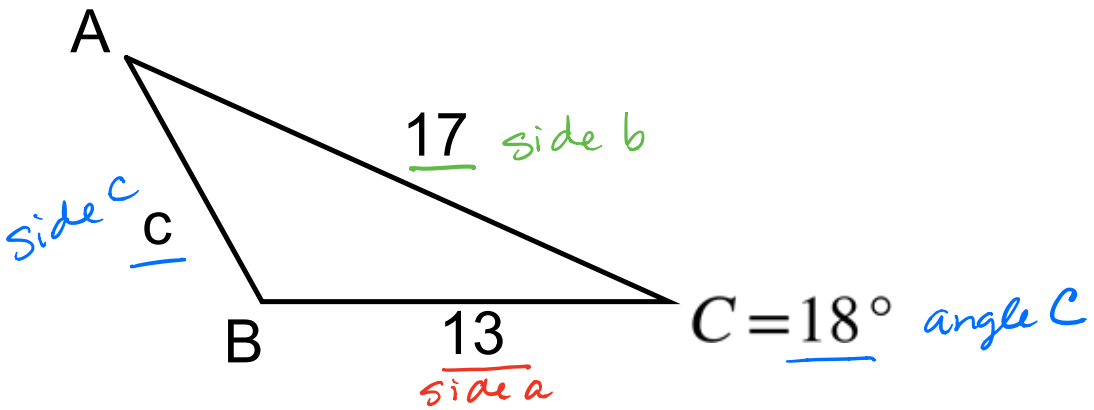
2 sides and 1 angle.

We can not use the Law of Sines.



We must use the Law of Cosines.

~~Solve the triangle.~~ Solve for side c.
Round to the nearest tenth.



the law of Cosines...

$$c^2 = 13^2 + 17^2 - 2(13)(17)\cos 18^\circ$$

$$c^2 = 169 + 289 - 442\cos 18^\circ$$

$$\sqrt{c^2} = \sqrt{37.6}$$ take the squared root on both sides.

$$\boxed{c = 6.1}$$

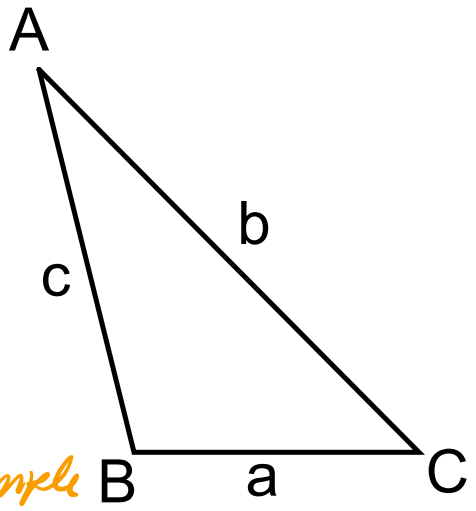
these are the formulas for...

Law of Cosines

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

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

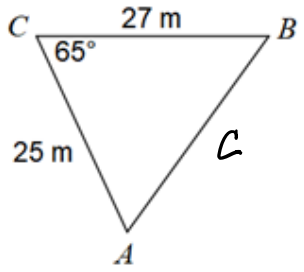
$$c^2 = a^2 + b^2 - 2ab\cos C$$



we used this on in the example above.

Find each measurement indicated. Round your answers to the nearest tenth.

1) Find AB



$c^2 = 25^2 + 27^2 - 2(25)(27)\cos 65$

$c^2 = 625 + 729 - 1350\cos 65$

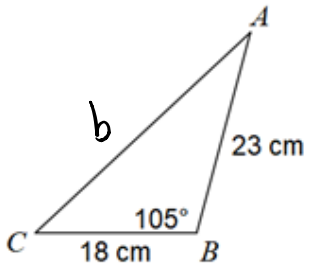
$c^2 = 1354 - 570.5$

$\sqrt{c^2} = \sqrt{783.5}$

$c = 27.99$ or $\boxed{28.0}$

Find each measurement indicated. Round your answers to the nearest tenth.

3) Find AC



$b^2 = 18^2 + 23^2 - 2(18)(23)\cos 105°$

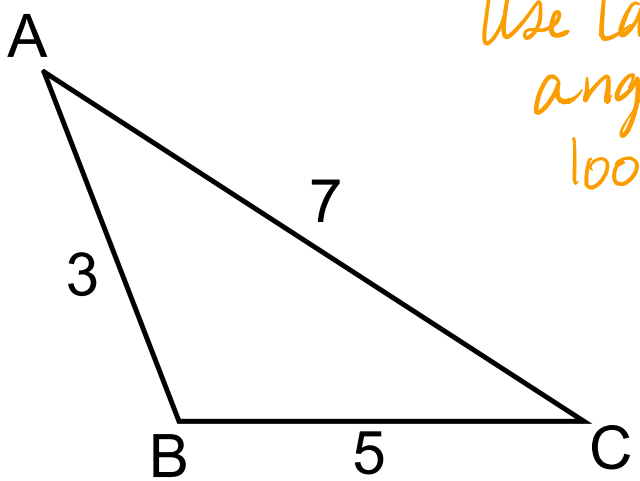
$b^2 = 324 + 529 - (-214.3)$

$\sqrt{b^2} = \sqrt{1067.3}$

$b = 32.7$

Solve the triangle

Notice we do not have and angles but all 3 sides. Use Law of Cosines to find an angle. We will start by looking for angle A.



$5^2 = 7^2 + 3^2 - 2(7)(3)\cos A$

$25 = 49 + 9 - 42\cos A$

$25 = 58 - 42\cos A$

$-58 \quad -58$

$\frac{-33}{-42} = \frac{-42\cos A}{-42}$

$\cos^{-1}\frac{-33}{-42} = \cos^{-1}\cos A$

$\cos^{-1}\frac{-33}{-42} = A$

$38.2 = A$

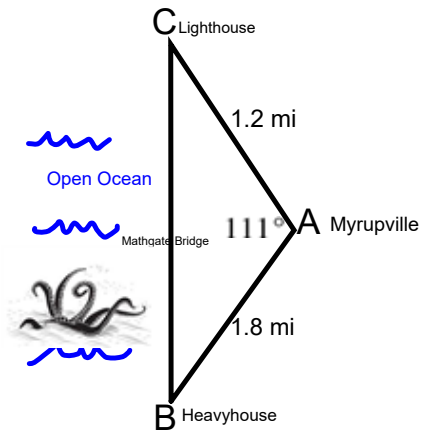
Do the same to find angle B.

Then use

$180 - \angle A - \angle B = \angle C$

Try this on your own...

The people of Myrupville need to build a bridge across Myrupville Bay. They plan to have it go from the Lighthouse on one side of the bay to the Heavyhouse on the other side of the bay. How long does the Mathgate Bridge need to be? What angles do the "Houses" make with Myrupville?



Attachments

HW 7-2 Law of Sines.pdf