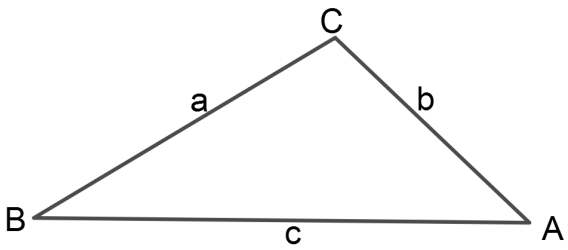
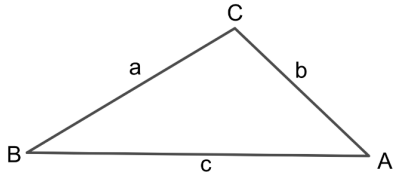
Sec 14-5: Law of Cosines



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

This side & angle must be opposite of each other

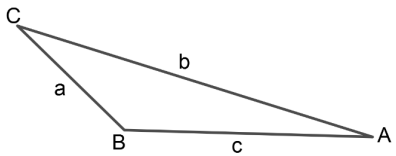


If angle B is less than 90° side b should be less than a hypotenuse.

Cosine of an angle less than 90° is positive

$c^2 = a^2 + b^2 - 2ab\text{Cos}C$

Therefore, c^2 will be less than if it were a right triangle.



If angle B is greater than 90° side b should be greater than a hypotenuse.

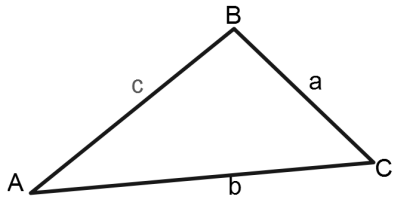
Cosine of an angle greater than 90° is negative

$c^2 = a^2 + b^2 - 2ab\text{Cos}C$

Therefore, c^2 will be more than if it were a right triangle.

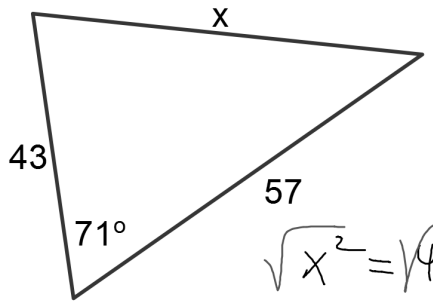
$c^2 = a^2 + b^2 - 2ab\text{Cos}C$

What information is needed in order to use the Law of Cosines to find a missing side?



The angle that is opposite the missing side and other two sides.

Use the Law of Cosines to find the measure of x to the nearest tenth.

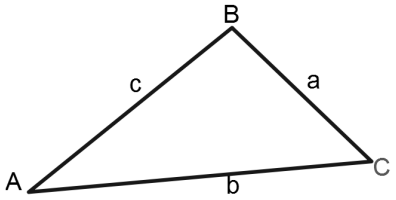


$\sqrt{x^2} = \sqrt{43^2 + 57^2 - 2(43)(57)\cos 71}$

$x = 59.2$

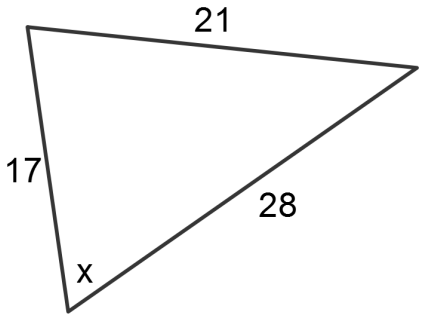
$c^2 = a^2 + b^2 - 2ab\cos C$

What information is needed in order to use the Law of Cosines to find a missing angle?



All three sides

Use the Law of Cosines to find the measure of x to the nearest tenth.



$21^2 = 17^2 + 28^2 - 2(17)(28)\cos X$

$-632 = -952\cos X$

$\cos X = \frac{-632}{-952}$

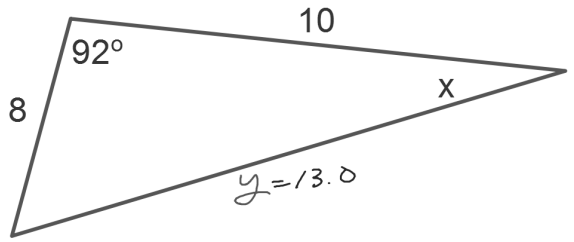
$X = \cos^{-1}\left(\frac{-632}{-952}\right)$

$X = 48.4°$

Do you have to worry about whether there are two possible triangles when using the Law of Cosines to find a missing angle?

No, the "other" answer when finding an angle using inverse Cosine is it's opposite.
When turned into its positive coterminal angle this "other" answer will be more than 180° which can't be part of a triangle.

Find the measure of x to the nearest tenth.



first you need to find the side opposite 92°

$y^2 = 8^2 + 10^2 - 2(8)(10)\cos 92°$

$y = 13.0$

Now you can use either the law of Sines or Cosines to find X

Using Law of Sines $\frac{\sin 92}{13} = \frac{\sin x}{8}$ $x = \sin^{-1}\left(\frac{8 \sin 92}{13}\right)$

$x = 38°$

The "other" answer from inverse sine is 142° and this isn't possible because together with 92° it would be more than 180°.

You can now complete Hwk #30

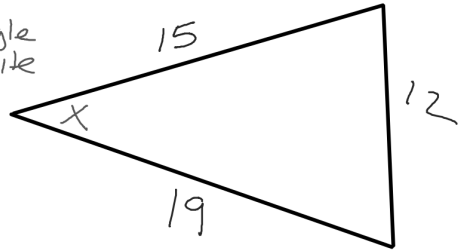
Sec 14-5

Page 810 Due tomorrow

Problems 1, 2, 7, 8, 14, 25, 26, 33

The sides of a triangle are 15cm, 12cm, and 19cm. Find the measure of the smallest angle. Round to the nearest tenth.

Smallest angle will be opposite the smallest side



$12^2 = 15^2 + 19^2 - 2(15)(19)\cos x$

$-442 = -570\cos x$

$\cos x = \frac{-442}{-570}$

$\angle x = \cos^{-1}\left(\frac{-442}{-570}\right) \approx 39.2°$