Foundations and Pre-Calculus 10

2.1-2.5 Trigonometry – Finding a missing Angle

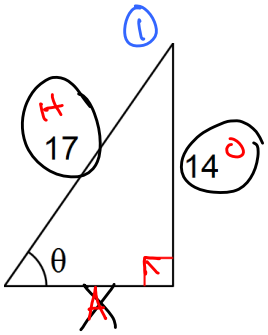
So far we've looked at finding a missing side given another side and an angle in a right triangle. We can also use trigonometry to find missing angles as long as we know 2 sides of a right triangle. This is called "Inverse Trig" and we choose and set up the trig ratio the same way as we did when looking for a missing side. ← find them.

Our Inverse Trig buttons are located very close to the regular Trig buttons on our calculator. They look like this:

SIN^{-1} COS^{-1} TAN^{-1} ← pronounced: "tangent inverse" or "tan inverse"

We use these buttons **only** when finding a missing angle!

Ex. Find the missing angle "θ".



① ② $\sin\theta = \frac{O}{H}$

③ $\sin\theta = \frac{14}{17}$

④ $\sin\theta = 0.8235$

⑤ $\theta = \sin^{-1}(0.8235)$

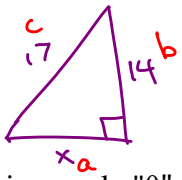
$\theta = 55.4°$

Steps:

1) label sides O, A, H
2) choose trig ratio: SOHCAHTOA
3) sub values into trig ratio
4) evaluate fraction as a decimal
5) find inverse trig of this decimal

Once we have solved the missing angle in the right triangle then we can find the other acute angle by remembering that all angles in every triangle must add to 180°. How could we find the remaining unknown side of this triangle? → $180° - 90° - 55.4 = 34.6°$

Pythagorean Theorem:



$a^2 + b^2 = c^2$

$x^2 + 14^2 = 17^2$

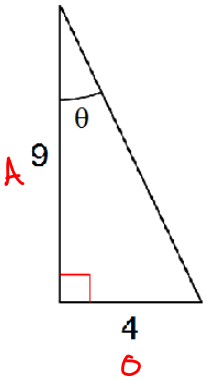
$x^2 + 196 = 289 - 196$

$\sqrt{x^2} = \sqrt{93}$

$x = 9.6$

Solving a triangle: → when you know all the angles & all the sides of a triangle

You try: Find the missing angle "θ".

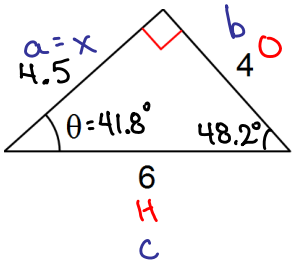


$\tan\theta = \frac{4}{9}$

$\theta = \tan^{-1}\left(\frac{4}{9}\right)$

$\theta = 24.0°$

Try again: Find all the missing angles and sides of this triangle.



$\sin\theta = \frac{4}{6}$

$\theta = \sin^{-1}\left(\frac{4}{6}\right)$

$\theta = 41.8°$

$180 - 90 - 41.8 = 48.2°$

$a^2 + b^2 = c^2$

$x^2 + 4^2 = 6^2$

$x^2 + 16 = 36$

$x = \sqrt{20}$

$x \doteq 4.5$

* write the calculated information on the picture.