

Elftmann Student Success Center

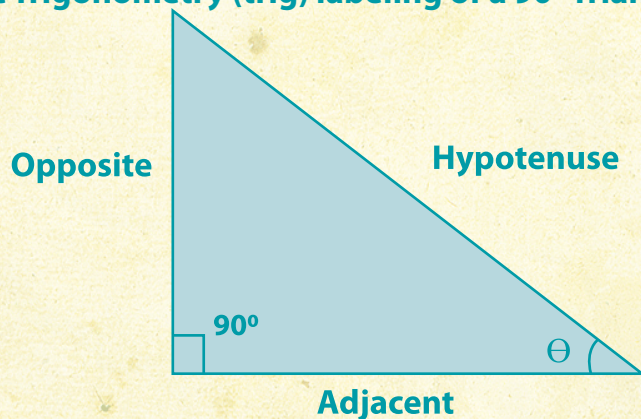
The Math Center

Introduction To Trigonometry

Trigonometry is the math that deals with ratio relationships between the sides & angles of triangles.

Trigonometry (trig) specifically uses 90° triangle relationships to help us measure and analyze information needed to understand many areas of science and engineering.

Basic Trigonometry (trig) labeling of a 90° Triangle



If we know the length of two sides of a 90° triangle we can determine the angular measure of the reference angle θ .

The reference angle determines which side we refer to as opposite and which is referred to as adjacent. Wherever angle θ is, this is the reference point. The side opposite of θ is simply referred to as the "side opposite" and the side connected to θ is called "side adjacent".

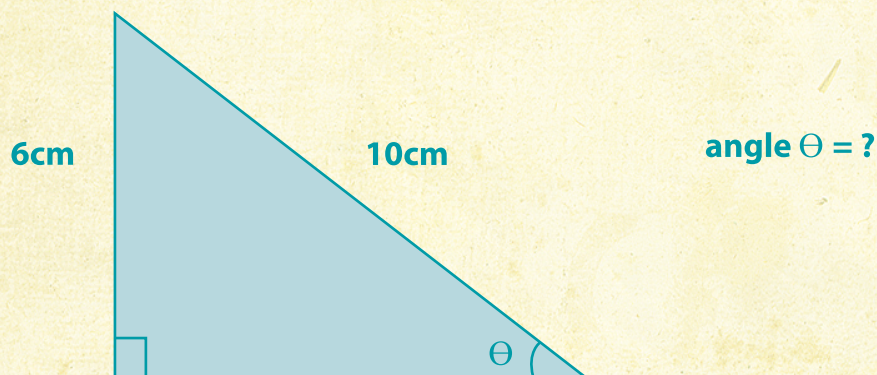


Here are the basic 'trig' facts that you need to know (make a list):

- The 3 angles of any triangle = 180°
- The hypotenuse is the longest side of a 90° triangle.
- Sine of angle $\Theta = \frac{\text{side opposite}}{\text{hypotenuse}} = \frac{\text{Opp}}{\text{Hyp}}$ known as $\text{Sin } \Theta = \frac{O}{H}$
- Cosine of angle $\Theta = \frac{\text{side adjacent}}{\text{hypotenuse}} = \frac{\text{Adj}}{\text{Hyp}}$ known as $\text{Cos } \Theta = \frac{A}{H}$
- Tangent of angle $\Theta = \frac{\text{side opposite}}{\text{side adjacent}} = \frac{\text{Opp}}{\text{Adj}}$ known as $\text{Tan } \Theta = \frac{O}{A}$

Note: As long as you are given two sides, you can solve for angle Θ using the above ratio relationships. If you are given angle Θ , and the length of one of the sides, you can solve for the missing side using the above ratio relationships.

Example: Given the 90° triangle given; determine angle Θ in degrees.



Using Θ as our reference, we can see that side **opposite was given, 6cm**. Also, the **hypotenuse was given, 10cm**. To determine angle Θ , **we will use sine** to help us, because it uses the side opposite and hypotenuse to determine angle Θ .

$$\text{Sin } \Theta = \frac{\text{Opp}}{\text{Hyp}} = \frac{6\text{cm}}{10\text{cm}} = 0.6 \text{ then convert to degree on a calculator use}$$

the inverse of sine, $\sin^{-1} 0.6 = 36.87^\circ$ so, angle Θ equals 36.87°

(note: the angle Θ is rounded to the hundredths)

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