

## Math 150, Section 5.2

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## Purpose of This Section

In this section we learn the following

- ▶ Definition of the trigonometric ratios **sine**, **cosine**, **tangent**, **cosecant**, **secant**, and **cotangent**
- ▶ The value of all the trigonometric ratios sine and cosine for the angles  $0, \pi/6, \pi/4, \pi/3, \pi/2$
- ▶ How to write all the remaining trigonometric ratios in terms of sine and cosine
- ▶ Solving right angled triangles

## Trigonometric ratios

For a right angled triangle we define the trigonometric ratios **sine**, **cosine**, **tangent**, **cosecant**, **secant**, and **cotangent** as follows

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}} \quad \cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} \quad \tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\csc \theta = \frac{\text{hypotenuse}}{\text{opposite}} \quad \sec \theta = \frac{\text{hypotenuse}}{\text{adjacent}} \quad \cot \theta = \frac{\text{adjacent}}{\text{opposite}}$$

## Sine and Cosine values for Special angles

By constructing triangles with suitable sides one can show that the following table is correct. You are required to know these values as they are often used in problems.

$\theta$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin \theta$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0

The value of any other trigonometric ratios at these angles can be found from the values of sine and cosine.

## Solving Right Angled Triangles

Given an angle (non perpendicular one) and a side of a right angled triangle it is possible to find all the other sides uniquely. This process is called solving the right angled triangle. You are required to know how to do this.