Trignometric Functions

1 Measuring Angles

A **ray** is a line with one endpoint. Two rays with a common endpoint define an **angle**, which is formed by rotating one ray about its endpoint. The ray in the starting position is called the **initial side** and the ray in the ending position is called the **terminal side**. The endpoint is called the angle's **vertex**.

Coterminal angles: Angles in standard position with common terminal sides are called **coterminal angles**.

Complementary and Supplementary angles: Two positive angles are **complementary** if the sum of their measures is 90 deg. Two positive angles are **supplementary** if the sum of their measures is 180 deg.

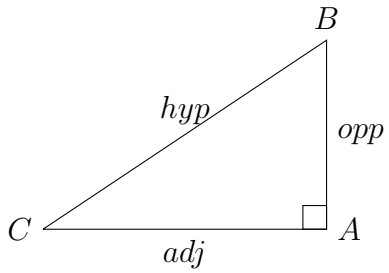
Definition: **Radians** are a unit of angular measure defined such that $2\pi \text{radians} = 360\,\text{deg}$.

Converting between Degrees and Radians:
Degree to Radians: Multiply the degree by $\frac{\pi \text{radians}}{180\,\text{deg}}$
Radians to Degree: Multiply the radiasn by $\frac{180\,\text{deg}}{\pi \text{radians}}$

Definition: An **arc** is a portion of the circumference of a circle. A **central angle** is an angle within a circle where the angle's vertex is at the circle's center.

The Arc Length Formula: If a central angles θ intercepts an arc of length s in a circle with radius r, then $s = r\theta$.

2 Introduction to the Trigonometric Functions

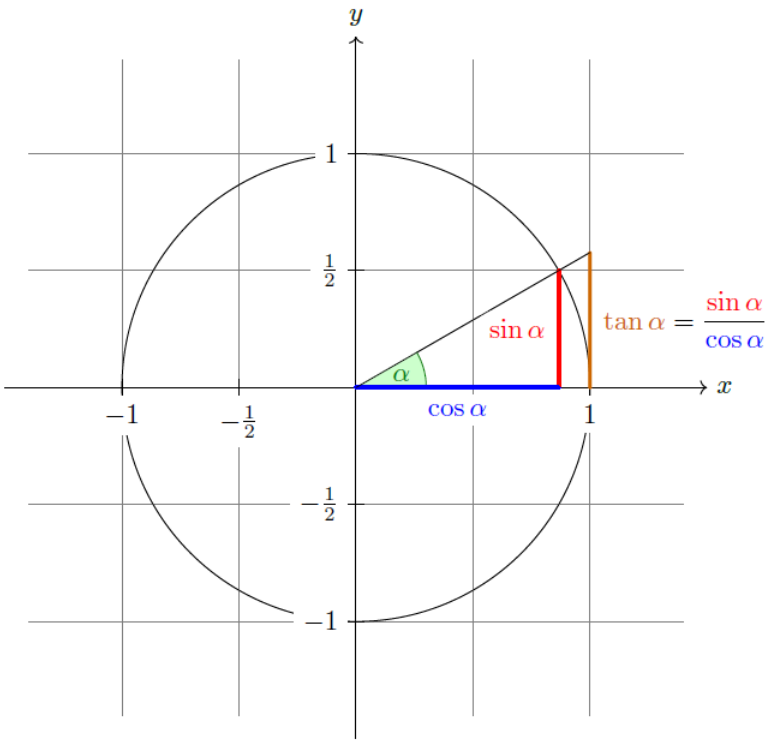


$$\sin C = \frac{\text{opp}}{\text{hyp}} \qquad \csc C = \frac{\text{hyp}}{\text{opp}}$$

$$\cos C = \frac{\text{adj}}{\text{hyp}} \qquad \sec C = \frac{\text{hyp}}{\text{adj}}$$

$$\tan C = \frac{\text{opp}}{\text{adj}} \qquad \cot C = \frac{\text{adj}}{\text{opp}}$$

3 Trigonometric Functions in the Coordinate Plane



3.1 Signs of the Trigonometric Functions of Angle θ

	I	II	III	IV
sin	+	+	-	-
cos	+	-	-	+
tan	+	-	+	-

3.2 The Trigonometric Functions of Important Angles

θ (deg)	θ (rad)	sin	cos	tan
0 deg	0	0	1	0
30 deg	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
45 deg	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
60 deg	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	1
90 deg	$\frac{\pi}{2}$	1	0	und