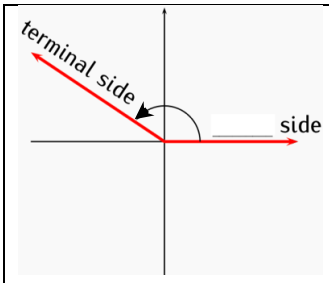
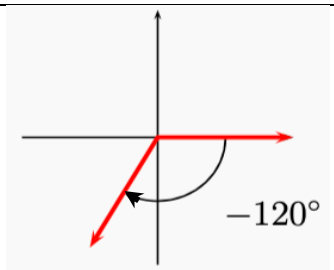
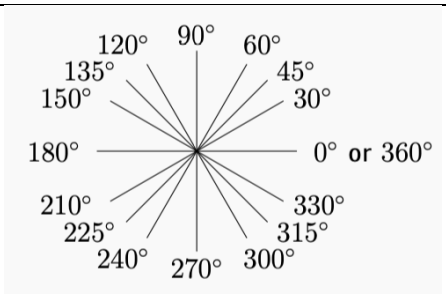
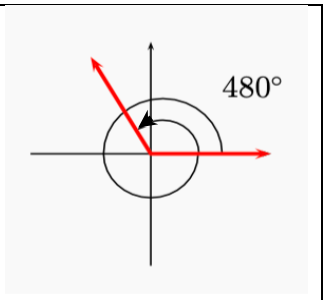
MAT1375, Classwork18, Fall2026

Ch17. Trigonometric Functions reviewed

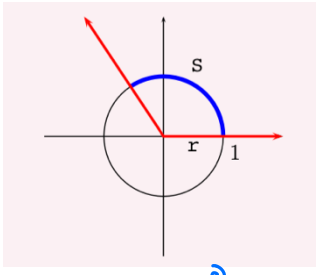
1. Angle in standard position:

An angle in the plane is in Standard position if its vertex is at the origin and the initial side is at the positive x-axis.

			
Counterclockwise direction: Angle > 0.	Clockwise direction: Angle < 0.	A full rotation measure as 360°	An angle can be more than 360°

2. The **Central angle** is an angle whose vertex is at the center of the circle.

The **radian** measure of the central angle of a circle is **ratio** of the length of the intercept arc ***s*** with the circle radius ***r***:

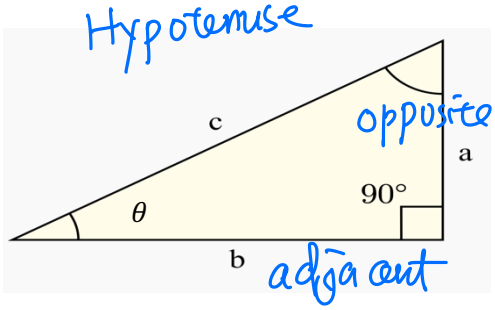


$$\text{Angle in radian} = \frac{s}{r}$$

When $r = 1$ and half circumference of this circle is π, then we have the central angle to be 180° in degree or π in radian. $180^\circ = \pi$.

3. Right Triangle Definitions of **Trigonometric Functions** and **Reciprocal Identities**:

$\sin(\theta) = \frac{\text{length of side opposite angle } \theta}{\text{length of Hypotenuse}} = \frac{a}{c}$	$\csc(\theta) = \frac{1}{\sin(\theta)} = \frac{c}{a}$
$\cos(\theta) = \frac{\text{length of side Adjacent to angle } \theta}{\text{length of Hypotenuse}} = \frac{b}{c}$	$\sec(\theta) = \frac{1}{\cos(\theta)} = \frac{c}{b}$
$\tan(\theta) = \frac{\text{length of side Opposite angle } \theta}{\text{length of side Adjacent to angle } \theta} = \frac{a}{b}$	$\cot(\theta) = \frac{1}{\tan(\theta)} = \frac{b}{a}$



4. Quotient Identities:

$$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)} \qquad \cot(\theta) = \frac{\cos(\theta)}{\sin(\theta)}$$

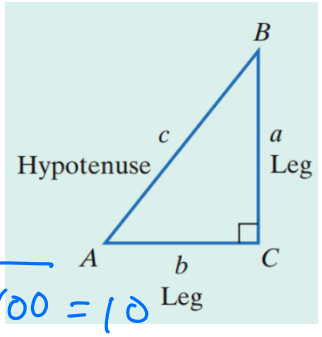
5. Reciprocal Identities:

$$\csc(\theta) = \frac{1}{\sin(\theta)} \qquad \sec(\theta) = \frac{1}{\cos(\theta)} \qquad \cot(\theta) = \frac{1}{\tan(\theta)}$$

6. The Pythagorean Theorem:

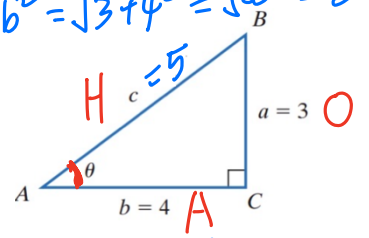
The sum of the square of the lengths of the legs of a right triangle equals the square of the length of the hypotenuse.

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



7. Given the right triangles. Find $\sin(\theta)$, $\cos(\theta)$, $\tan(\theta)$.

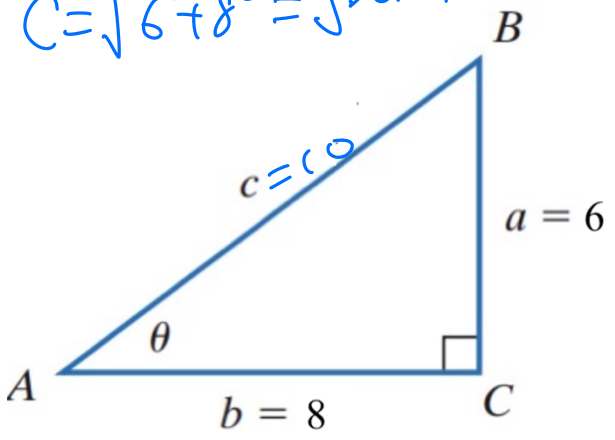
$C=\sqrt{a^2+b^2}=\sqrt{3^2+4^2}=\sqrt{25}=5$



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$\sin(\theta)=\frac{3}{5}$, $\cos(\theta)=\frac{4}{5}$, $\tan(\theta)=\frac{3}{4}$

$C=\sqrt{6^2+8^2}=\sqrt{36+64}=\sqrt{100}=10$



$\sin(\theta)=\frac{6}{10}=\frac{3}{5}$

$\cos(\theta)=\frac{8}{10}=\frac{4}{5}$

$\tan(\theta)=\frac{6}{8}=\frac{3}{4}$

8. The values of trigonometric functions only depend on the size of angle, not the size of the triangle.

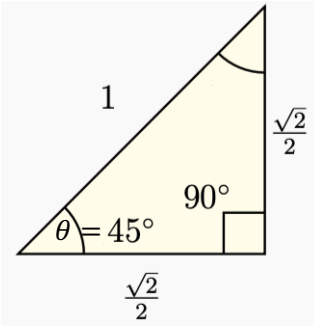
9. Pythagorean Triple: (a,b,c)

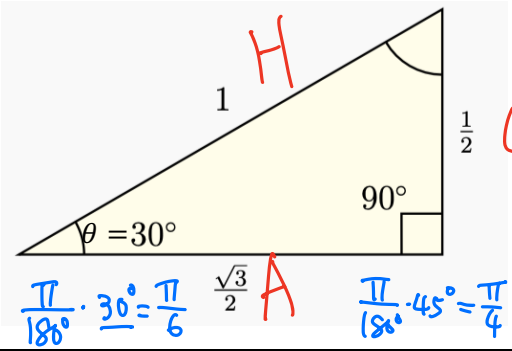
(3, 4, 5), (5, 12, 13), (7, 24, 25), (8, 15, 17)

(6, 8, 10)

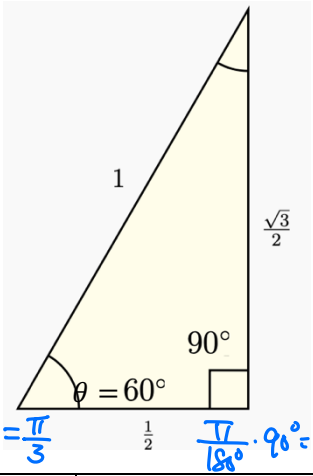
(9, 12, 15)

10. The values of trigonometric functions with special angles:





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$\frac{\pi}{180^\circ}\cdot 30^\circ=\frac{\pi}{6}$ $\frac{\pi}{180^\circ}\cdot 45^\circ=\frac{\pi}{4}$ $\frac{\pi}{180^\circ}\cdot 60^\circ=\frac{\pi}{3}$ $\frac{\pi}{180^\circ}\cdot 90^\circ=\frac{\pi}{2}$

θ	0 (or 0°)	$\frac{\pi}{6}$ (or 30°)	$\frac{\pi}{4}$ (or 45°)	$\frac{\pi}{3}$ (or 60°)	$\frac{\pi}{2}$ (or 90°)
$\sin(\theta)$ $\frac{O}{H}$	$\frac{\text{zero}}{H}=0$	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{O}{H}=1$ (O=H)
$\cos(\theta)$ $\frac{A}{H}$	$\frac{A}{H}=1$ (A=H)	$\frac{\frac{\sqrt{3}}{2}}{1}=\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	$\frac{A}{H}=\frac{\text{zero}}{H}=0$
$\tan(\theta)$ $\frac{O}{A}$	$\frac{\text{zero}}{A}=0$	$\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}=\frac{1}{2}\cdot\frac{2}{\sqrt{3}}=\frac{1}{\sqrt{3}}=\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$\frac{O}{A}=\frac{O}{\text{zero}}$ undefined!