Trigonometry

**Formula Sheet**

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| **Name** | **Definition** | **Formula** |
| Equation of a Circle | The equation of a circle describes all the points that form the circle on a plane.  | $$\left(x−h\right)^{2}+\left(y−k\right)^{2}=r^{2}$$Where $$\left(h,k\right)$$ is the center and the radius is $$r $$. |
| Unit Circle Equation | A circle centered at the origin (0,0) with a radius of 1.  | $$x^{2}+y^{2}=1$$ |
| 45-45-90 Special Right Triangle | A 45-45-90 special right triangle is made up of two angles, making it an isosceles triangle that form special side relationships. |  |
| 30-60-90 Special Right Triangle | A 30-60-90 special right triangle has one 60° angle and one that is 30° angle that form special side relationships. |  |
| Sine Function | The sine of an angle $$\theta  $$is equal to the length of the side that is opposite angle $$\theta  $$divided by the length of the hypotenuse. | $$\sin(\theta )=\frac{opposite}{hypotenuse}$$ |
| Cosine Function | The cosine of an angle $$\theta  $$is equal to the length of the side adjacent to the angle $$\theta  $$divided by the length of the hypotenuse. | $$\cos(\theta )=\frac{adjacent}{hypotenuse}$$ |
| Tangent Function | Tangent is the ratio of the sine and cosine functions. | $$\tan(\theta )=\frac{opposite}{adjacent}$$ |
| Trigonometric Functions on the Unit Circle | On the unit circle, when angle $$\theta  $$is formed by drawing a ray from the origin to the circle, they intersect at point $$\left(x,y\right)$$.  | * $$ sin\theta =y $$
* $$ cos\theta =x $$
* $$tan\theta =\frac{sin\theta }{cos\theta }=\frac{y}{x}$$

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| Radians and Degrees | A radian is another unit of measurement for angles, the other measurement being degrees. Using conversion factors, you can convert between the two measurements. | Degrees to Radians Conversion Factor: $$\frac{\pi }{180°}$$Radians to Degrees Conversion Factor: $$\frac{180°}{\pi }$$ |
| Unit Circle | In trigonometry, the unit circle has a radius of 1 and is centered at the origin. It is used to find the values for sine and cosine of common angles.The coordinates of each $$\left(x,y\right)$$ point are written $$\left(cos\theta ,sin\theta \right)$$. |  |
| Signs of Trigonometric Functions | The signs of trigonometric functions are dependent on which quadrant the angle is in on the coordinate plane/unit circle. |  |
| Pythagorean Identity | The *Pythagorean Identity* is another way of expressing the equation of the unit circle in terms of the angle $$\theta  $$. It can be used to find the sine, cosine, and tangent of an angle. The identity can be rearranged to isolate a specific function. | $$sin^{2}\theta +cos^{2}\theta =1$$The identity can be rearranged to identify a specific function:* $$sin\theta =\pm \sqrt{1−cos^{2}\theta }$$
* $$cos\theta =\pm \sqrt{1−sin^{2}\theta }$$
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