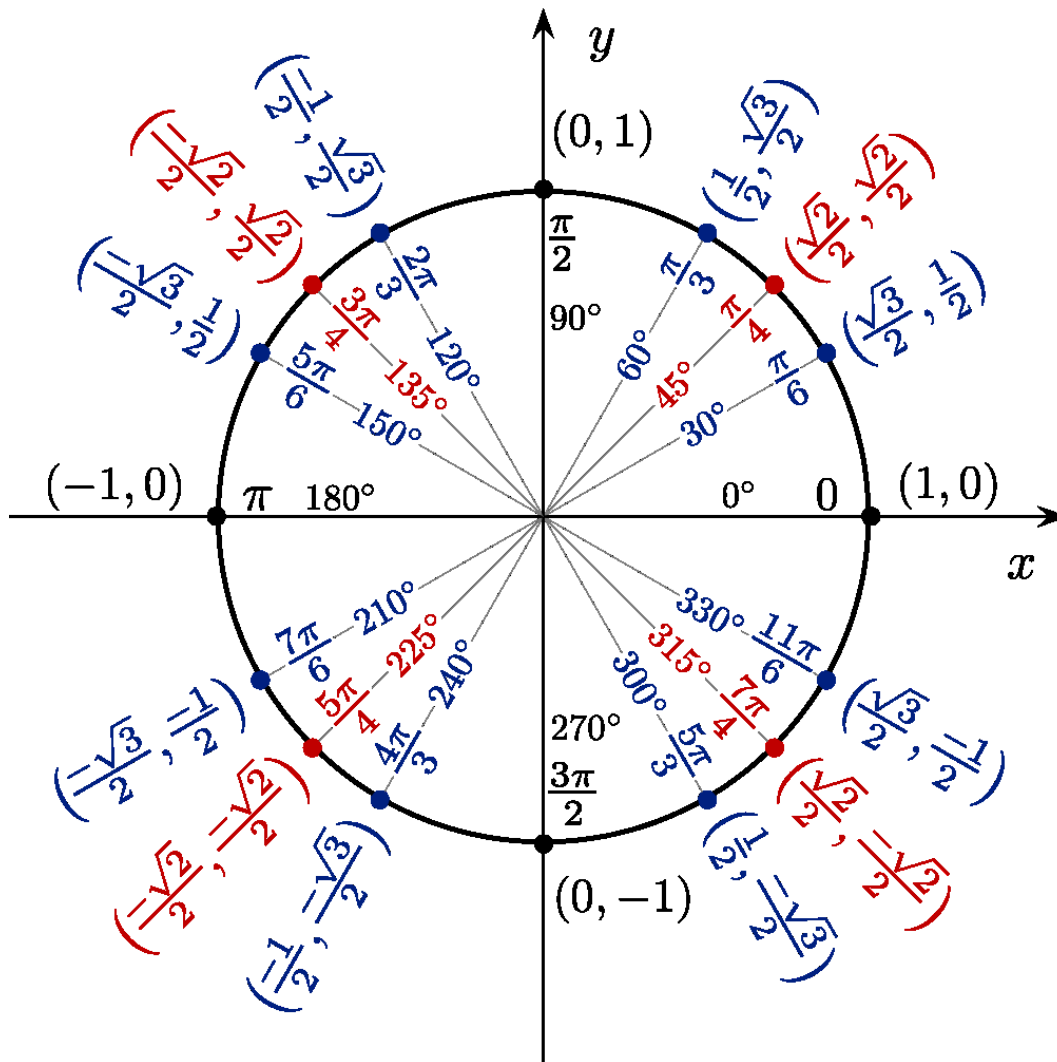


Trigonometry and Geometry

Unit Circle and Trigonometric Functions

To practice basic trigonometry, you can play Trig Master at davidsmath.com/tm (this counts towards your memory practice time! 😊) Also, you can practice writing out the unit circle from memory.

Write angles in radians and degrees first, then points at those angles.



Use the Memory Practice Log to cover up the right side of the table.

$\sin t$	$\sin t = y$	Think: sine is y on the unit circle
$\cos t$	$\cos t = x$	Think: cosine is x on the unit circle
$\tan t$	$\tan t = \frac{y}{x}$ or $\tan t = \frac{\sin t}{\cos t}$	
$\csc t$	$\csc t = \frac{1}{y}$ or $\csc t = \frac{1}{\sin t}$	Think: csc is the reciprocal of sin
$\sec t$	$\sec t = \frac{1}{x}$ or $\sec t = \frac{1}{\cos t}$	Think: sec is the reciprocal of cos
$\cot t$	$\cot t = \frac{x}{y}$ or $\cot t = \frac{\cos t}{\sin t}$ or $\cot t = \frac{1}{\tan t}$	Think: cot is the reciprocal of tan

Trigonometric Identities

Use the Memory Practice Log to cover up the right side of the table.

$\sin^2 x + \cos^2 x =$	$\sin^2 x + \cos^2 x = 1$	Pythagorean Theorem on unit circle
$\tan^2 x + 1 =$	$\tan^2 x + 1 = \sec^2 x$	Divide by $\cos^2 x$
$1 + \cot^2 x =$	$1 + \cot^2 x = \csc^2 x$	Divide by $\sin^2 x$
$\sin(x + y) =$	$\sin(x + y) = \sin x \cos y + \cos x \sin y$	Same sign
$\sin(x - y) =$	$\sin(x - y) = \sin x \cos y - \cos x \sin y$	Same sign
$\cos(x + y) =$	$\cos(x + y) = \cos x \cos y - \sin x \sin y$	Opposite sign
$\cos(x - y) =$	$\cos(x - y) = \cos x \cos y + \sin x \sin y$	Opposite sign
$\sin 2x =$	$\sin 2x = 2 \sin x \cos x$	$\sin 2x = \sin(x + x)$, then use sine addition formula above
$\cos 2x =$	$\cos 2x = \cos^2 x - \sin^2 x$ $= 1 - 2 \sin^2 x$ $= 2 \cos^2 x - 1$	$\cos 2x = \cos(x + x)$, then use cosine addition formula above

Geometry Formulas

Use the Memory Practice Log to cover up the right side of the table.

Distance/rate/time formula	$d = rt$	How far can you throw a d(a)rt?
Pythagorean Theorem	$a^2 + b^2 = c^2$ (or $(leg)^2 + (leg)^2 = (hypotenuse)^2$)	
Area of rectangle	$A = lw$	Multiply dimensions
Area of circle	$A = \pi r^2$	
Area of triangle	$A = \frac{1}{2}bh$	Half a rectangle or parallelogram
Circumference of circle	$C = 2\pi r = \pi d$	
How to get perimeter of any polygon	Just add the lengths of the sides	So, perimeter of rectangle is $P = l + l + w + w$ $= 2l + 2w$
How to get the surface area of a 3-D surface	Just add the areas of the faces/sides	
Volume of a box (also called a rectangular prism)	$V = lwh$	Like rectangle, but one more dimension
Volume of circular cylinder	$V = \pi r^2 h$	Area of circle times height of cylinder
Volume of cone	$V = \frac{1}{3}\pi r^2 h$	$\frac{1}{3}$ volume of circular cylinder
Surface area of sphere	$S = 4\pi r^2$	4 times area of circle
Volume of sphere	$V = \frac{4}{3}\pi r^3$	