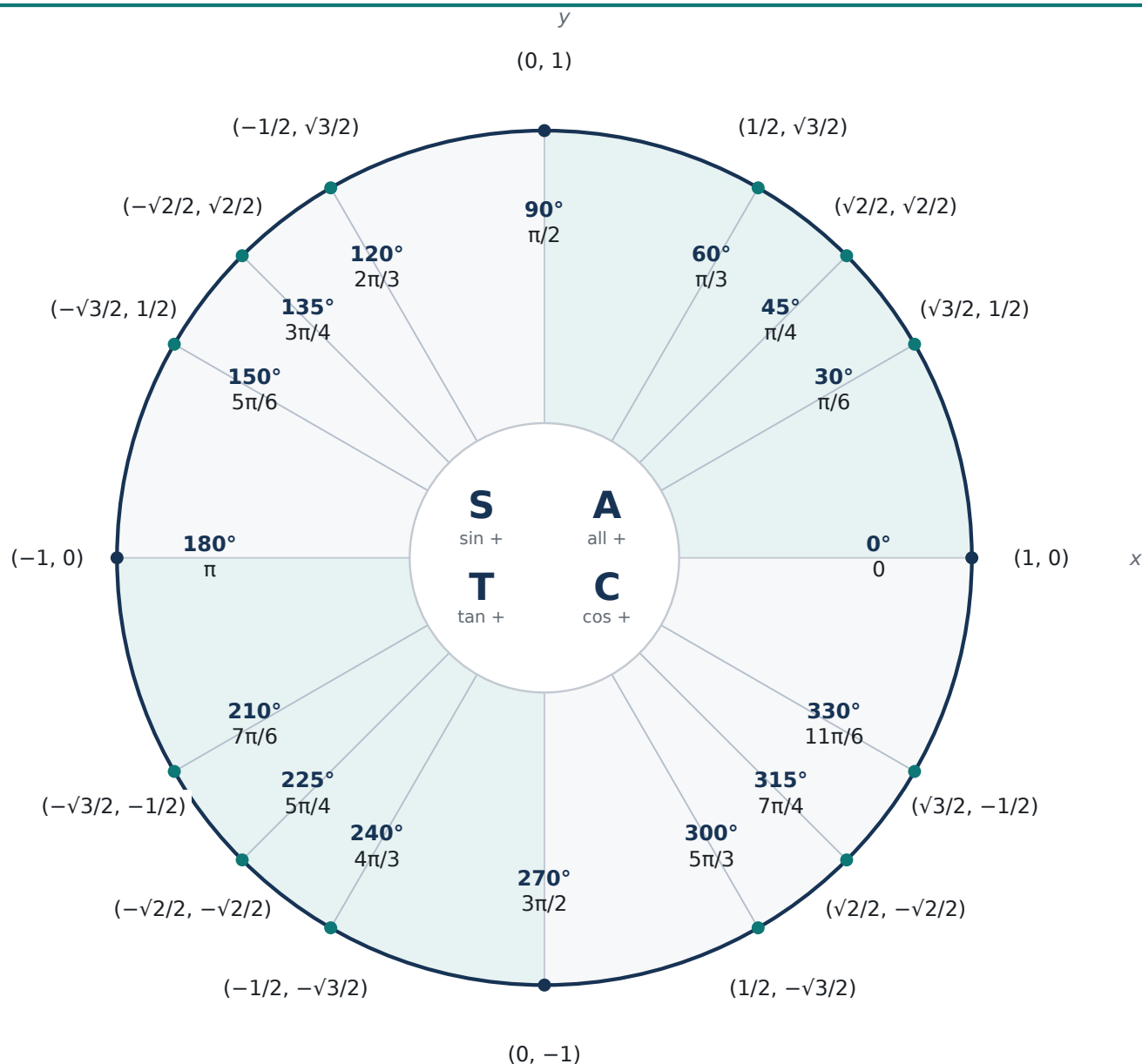


The Unit Circle

[notesofmath.com](https://www.notesofmath.com)

Every standard angle in degrees and radians, with exact coordinates



How to read it

Every point is $(\cos \theta, \sin \theta)$, because the radius is 1. Angles run anticlockwise from the positive x-axis. Inside each spoke: degrees and radians. Outside: the exact coordinates. Centre: which functions are positive (ASTC).

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Unit Circle Values Table

sin, cos, tan, csc, sec and cot at all 16 standard angles

Degrees	Radians	sin θ	cos θ	tan θ	csc θ	sec θ	cot θ
0°	0	0	1	0	undef	1	undef
30°	$\pi/6$	1/2	$\sqrt{3}/2$	$\sqrt{3}/3$	2	$2\sqrt{3}/3$	$\sqrt{3}$
45°	$\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$	1	$\sqrt{2}$	$\sqrt{2}$	1
60°	$\pi/3$	$\sqrt{3}/2$	1/2	$\sqrt{3}$	$2\sqrt{3}/3$	2	$\sqrt{3}/3$
90°	$\pi/2$	1	0	undef	1	undef	0
120°	$2\pi/3$	$\sqrt{3}/2$	-1/2	$-\sqrt{3}$	$2\sqrt{3}/3$	-2	$-\sqrt{3}/3$
135°	$3\pi/4$	$\sqrt{2}/2$	$-\sqrt{2}/2$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
150°	$5\pi/6$	1/2	$-\sqrt{3}/2$	$-\sqrt{3}/3$	2	$-2\sqrt{3}/3$	$-\sqrt{3}$
180°	π	0	-1	0	undef	-1	undef
210°	$7\pi/6$	-1/2	$-\sqrt{3}/2$	$\sqrt{3}/3$	-2	$-2\sqrt{3}/3$	$\sqrt{3}$
225°	$5\pi/4$	$-\sqrt{2}/2$	$-\sqrt{2}/2$	1	$-\sqrt{2}$	$-\sqrt{2}$	1
240°	$4\pi/3$	$-\sqrt{3}/2$	-1/2	$\sqrt{3}$	$-2\sqrt{3}/3$	-2	$\sqrt{3}/3$
270°	$3\pi/2$	-1	0	undef	-1	undef	0
300°	$5\pi/3$	$-\sqrt{3}/2$	1/2	$-\sqrt{3}$	$-2\sqrt{3}/3$	2	$-\sqrt{3}/3$
315°	$7\pi/4$	$-\sqrt{2}/2$	$\sqrt{2}/2$	-1	$-\sqrt{2}$	$\sqrt{2}$	-1
330°	$11\pi/6$	-1/2	$\sqrt{3}/2$	$-\sqrt{3}/3$	-2	$2\sqrt{3}/3$	$-\sqrt{3}$

"undef" = undefined: the function has a vertical asymptote at that angle.

Degrees ↔ radians in one step

Degrees → radians

multiply by $\pi/180$

$$60^\circ \times \pi/180 = \pi/3$$

Radians → degrees

multiply by $180/\pi$

$$3\pi/4 \times 180/\pi = 135^\circ$$

Worth memorising: $\pi/6 = 30^\circ$ $\pi/4 = 45^\circ$ $\pi/3 = 60^\circ$ $\pi/2 = 90^\circ$ $\pi = 180^\circ$ $2\pi = 360^\circ$

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