

Trigonometric Functions of Some Special Angles (Degrees)

Angle	sin	cos	tan	cot	sec	
0°	0	1	0	∞	1	∞
15° = π/12	$\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$2-\sqrt{3}$	$2+\sqrt{3}$	$\frac{\sqrt{2}(\sqrt{3}-1)}{2\sqrt{3}/3}$	$\frac{\sqrt{2}(\sqrt{3}+1)}{2}$
30° = π/6	1/2	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$\frac{2}{\sqrt{2}}$	$\frac{2\sqrt{3}}{3}$
45° = π/4	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1	2	$\sqrt{2}$
60° = π/3	$\frac{\sqrt{3}}{2}$	1/2	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	$\frac{2}{\sqrt{2}(\sqrt{3}+1)}$	$\frac{2\sqrt{3}}{3}$
75° = 5π/12	$\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$2+\sqrt{3}$	$2-\sqrt{3}$	$\frac{2}{\sqrt{2}(\sqrt{3}-1)}$	$\frac{\sqrt{2}(\sqrt{3}-1)}{2}$
90° = π/2	1	0	∞	0	∞	1
105° = 7π/12	$\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$-\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$-(2+\sqrt{3})$	$-(2-\sqrt{3})$	$-\frac{2}{\sqrt{2}(\sqrt{3}+1)}$	$\frac{\sqrt{2}(\sqrt{3}-1)}{2}$
120° = 2π/3	$\frac{\sqrt{3}}{2}$	-1/2	$-\sqrt{3}$	$-\frac{\sqrt{3}}{3}$	$-\frac{2}{\sqrt{2}}$	$\frac{2\sqrt{3}}{3}$
135° = 3π/4	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	-1	$-\frac{2}{\sqrt{2}(\sqrt{3}-1)}$	$\sqrt{2}$
150° = 5π/6	1/2	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$	$-\sqrt{3}$	$-\frac{2}{\sqrt{2}(\sqrt{3}+1)}$	2
165° = 11π/12	$\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$-\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$-(2-\sqrt{3})$	$-(2+\sqrt{3})$	$-\frac{2}{\sqrt{2}(\sqrt{3}-1)}$	$\frac{\sqrt{2}(\sqrt{3}+1)}{2}$
180° = π	0	-1	0	∞	-1	∞
195° = 13π/12	$-\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$-\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$2-\sqrt{3}$	$2+\sqrt{3}$	$-\frac{2}{\sqrt{2}(\sqrt{3}-1)}$	$\frac{\sqrt{2}(\sqrt{3}+1)}{2}$
210° = 7π/6	-1/2	$-\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$-\frac{2}{\sqrt{2}}$	2
225° = 5π/4	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	1	1	$-\frac{2}{\sqrt{2}(\sqrt{3}+1)}$	$\sqrt{2}$
240° = 4π/3	$-\frac{\sqrt{3}}{2}$	-1/2	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	$-\frac{2}{\sqrt{2}(\sqrt{3}-1)}$	$\frac{2\sqrt{3}}{3}$
255° = 17π/12	$-\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$-\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$2+\sqrt{3}$	$2-\sqrt{3}$	$-\frac{2}{\sqrt{2}(\sqrt{3}+1)}$	$\frac{\sqrt{2}(\sqrt{3}-1)}{2}$
270° = 3π/2	-1	0	∞	0	∞	1
285° = 19π/12	$-\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$-(2+\sqrt{3})$	$-(2-\sqrt{3})$	$\frac{2}{\sqrt{2}(\sqrt{3}+1)}$	$\frac{\sqrt{2}(\sqrt{3}-1)}{2}$
300° = 5π/3	$-\frac{\sqrt{3}}{2}$	1/2	$-\sqrt{3}$	$-\frac{\sqrt{3}}{3}$	$\frac{2}{\sqrt{2}}$	$\frac{2\sqrt{3}}{3}$
315° = 7π/4	$-\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	-1	-1	$\frac{2}{\sqrt{2}(\sqrt{3}-1)}$	$\sqrt{2}$
330° = 11π/6	-1/2	$\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$	$-\sqrt{3}$	$\frac{2}{\sqrt{2}(\sqrt{3}+1)}$	2
345° = 23π/12	$-\frac{\sqrt{2}(\sqrt{3}-1)}{4}$	$\frac{\sqrt{2}(\sqrt{3}+1)}{4}$	$-(2-\sqrt{3})$	$-(2+\sqrt{3})$	$\frac{2}{\sqrt{2}(\sqrt{3}-1)}$	$\frac{\sqrt{2}(\sqrt{3}+1)}{2}$

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Trigonometric Functions of Some Special Angles (Radians)

Angle	sin	cos	tan
0 = 0°	0	1	0
π/10 = 18°	$\frac{(\sqrt{5}-1)}{4}$	$\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$\frac{\sqrt{5} \cdot \sqrt{5-2\sqrt{5}}}{5}$
2π/10 = 36°	$\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$\frac{(\sqrt{5}+1)}{4}$	$\frac{\sqrt{5-2\sqrt{5}}}{\sqrt{5}}$
3π/10 = 54°	$\frac{(\sqrt{5}+1)}{4}$	$\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$\frac{\sqrt{5} \cdot \sqrt{5+2\sqrt{5}}}{5}$
4π/10 = 72°	$\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$\frac{(\sqrt{5}-1)}{4}$	$\frac{\sqrt{5+2\sqrt{5}}}{\sqrt{5}}$
5π/10 = 90°	1	0	∞
6π/10 = 108°	$\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$-\frac{(\sqrt{5}-1)}{4}$	$-\frac{\sqrt{5+2\sqrt{5}}}{\sqrt{5}}$
7π/10 = 126°	$\frac{(\sqrt{5}+1)}{4}$	$-\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$-\frac{\sqrt{5} \cdot \sqrt{5+2\sqrt{5}}}{5}$
8π/10 = 144°	$\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$-\frac{(\sqrt{5}+1)}{4}$	$-\frac{\sqrt{5-2\sqrt{5}}}{\sqrt{5}}$
9π/10 = 162°	$\frac{(\sqrt{5}-1)}{4}$	$-\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$-\frac{\sqrt{5} \cdot \sqrt{5-2\sqrt{5}}}{5}$
π = 180°	0	-1	0
11π/10 = 198°	$-\frac{(\sqrt{5}-1)}{4}$	$-\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$\frac{\sqrt{5} \cdot \sqrt{5-2\sqrt{5}}}{5}$
12π/10 = 216°	$-\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$-\frac{(\sqrt{5}+1)}{4}$	$\frac{\sqrt{5-2\sqrt{5}}}{\sqrt{5}}$
13π/10 = 234°	$-\frac{(\sqrt{5}+1)}{4}$	$-\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$\frac{\sqrt{5} \cdot \sqrt{5+2\sqrt{5}}}{5}$
14π/10 = 252°	$-\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$-\frac{(\sqrt{5}-1)}{4}$	$\frac{\sqrt{5+2\sqrt{5}}}{\sqrt{5}}$
15π/10 = 270°	-1	0	∞
16π/10 = 288°	$-\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$\frac{(\sqrt{5}-1)}{4}$	$-\frac{\sqrt{5+2\sqrt{5}}}{\sqrt{5}}$
17π/10 = 306°	$-\frac{(\sqrt{5}+1)}{4}$	$\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$-\frac{\sqrt{5} \cdot \sqrt{5+2\sqrt{5}}}{5}$
18π/10 = 324°	$-\frac{\sqrt{2} \cdot \sqrt{5-\sqrt{5}}}{4}$	$\frac{(\sqrt{5}+1)}{4}$	$-\frac{\sqrt{5-2\sqrt{5}}}{\sqrt{5}}$
19π/10 = 342°	$-\frac{(\sqrt{5}-1)}{4}$	$\frac{\sqrt{2} \cdot \sqrt{5+\sqrt{5}}}{4}$	$-\frac{\sqrt{5} \cdot \sqrt{5-2\sqrt{5}}}{5}$
2π = 360°	0	1	0

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Trigonometric Functions of Some Very Special Angles

Angle	sin	cos
$0^\circ = 0$	0	1
$3^\circ = \pi/60$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}-1) - 2(\sqrt{3}-1)\sqrt{5+\sqrt{5}})/16$	$(\sqrt{2}(\sqrt{3}-1)(\sqrt{5}-1) + 2(\sqrt{3}+1)\sqrt{5+\sqrt{5}})/16$
$6^\circ = \pi/30$	$(-(\sqrt{5}+1) + \sqrt{6}\sqrt{5-\sqrt{5}})/8$	$(\sqrt{3}(\sqrt{5}+1) + \sqrt{2}\sqrt{5-\sqrt{5}})/8$
$9^\circ = \pi/20$	$(\sqrt{2}(\sqrt{5}+1) - 2\sqrt{5-\sqrt{5}})/8$	$(\sqrt{2}(\sqrt{5}+1) + 2\sqrt{5-\sqrt{5}})/8$
$12^\circ = \pi/15$	$(-\sqrt{3}(\sqrt{5}-1) + \sqrt{2}\sqrt{5+\sqrt{5}})/8$	$((\sqrt{5}-1) + \sqrt{6}\sqrt{5+\sqrt{5}})/8$
$15^\circ = \pi/12$	$\sqrt{2}(\sqrt{3}-1)/4$	$\sqrt{2}(\sqrt{3}+1)/4$
$18^\circ = \pi/10$	$(\sqrt{5}-1)/4$	$\sqrt{2} \cdot \sqrt{5+\sqrt{5}}/4$
$21^\circ = 7\pi/60$	$(-\sqrt{2}(\sqrt{3}-1)(\sqrt{5}+1) + 2(\sqrt{3}+1)\sqrt{5-\sqrt{5}})/16$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}+1) + 2(\sqrt{3}-1)\sqrt{5-\sqrt{5}})/16$
$24^\circ = 2\pi/15$	$(\sqrt{3}(\sqrt{5}+1) - \sqrt{2}\sqrt{5-\sqrt{5}})/8$	$((\sqrt{5}+1) + \sqrt{6}\sqrt{5-\sqrt{5}})/8$
$27^\circ = 3\pi/20$	$(-\sqrt{2}(\sqrt{5}-1) + 2\sqrt{5+\sqrt{5}})/8$	$(\sqrt{2}(\sqrt{5}-1) + 2\sqrt{5+\sqrt{5}})/8$
$30^\circ = \pi/6$	1/2	$\sqrt{3}/2$
$33^\circ = 11\pi/60$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}-1) + 2(\sqrt{3}-1)\sqrt{5+\sqrt{5}})/16$	$(-\sqrt{2}(\sqrt{3}-1)(\sqrt{5}-1) + 2(\sqrt{3}+1)\sqrt{5+\sqrt{5}})/16$
$36^\circ = 2\pi/10$	$\sqrt{2} \cdot \sqrt{5-\sqrt{5}}/4$	$(\sqrt{5}+1)/4$
$39^\circ = 13\pi/60$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}+1) - 2(\sqrt{3}-1)\sqrt{5-\sqrt{5}})/16$	$(\sqrt{2}(\sqrt{3}-1)(\sqrt{5}+1) + 2(\sqrt{3}+1)\sqrt{5-\sqrt{5}})/16$
$42^\circ = 7\pi/30$	$(-(\sqrt{5}-1) + \sqrt{6}\sqrt{5+\sqrt{5}})/8$	$(\sqrt{3}(\sqrt{5}-1) + \sqrt{2}\sqrt{5+\sqrt{5}})/8$
$45^\circ = \pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$
$48^\circ = 5\pi/15$	$(\sqrt{3}(\sqrt{5}-1) + \sqrt{2}\sqrt{5+\sqrt{5}})/8$	$(-(\sqrt{5}-1) + \sqrt{6}\sqrt{5+\sqrt{5}})/8$
$51^\circ = 17\pi/60$	$(\sqrt{2}(\sqrt{3}-1)(\sqrt{5}+1) + 2(\sqrt{3}+1)\sqrt{5-\sqrt{5}})/16$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}+1) - 2(\sqrt{3}-1)\sqrt{5-\sqrt{5}})/16$
$54^\circ = 3\pi/10$	$(\sqrt{5}+1)/4$	$\sqrt{2} \cdot \sqrt{5-\sqrt{5}}/4$
$57^\circ = 19\pi/60$	$(-\sqrt{2}(\sqrt{3}-1)(\sqrt{5}-1) + 2(\sqrt{3}+1)\sqrt{5+\sqrt{5}})/16$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}-1) + 2(\sqrt{3}-1)\sqrt{5+\sqrt{5}})/16$
$60^\circ = \pi/3$	$\sqrt{3}/2$	1/2
$63^\circ = 7\pi/20$	$(\sqrt{2}(\sqrt{5}-1) + 2\sqrt{5+\sqrt{5}})/8$	$(-\sqrt{2}(\sqrt{5}-1) + 2\sqrt{5+\sqrt{5}})/8$
$66^\circ = 11\pi/30$	$((\sqrt{5}+1) + \sqrt{6}\sqrt{5-\sqrt{5}})/8$	$(\sqrt{3}(\sqrt{5}+1) - \sqrt{2}\sqrt{5-\sqrt{5}})/8$
$69^\circ = 23\pi/60$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}+1) + 2(\sqrt{3}-1)\sqrt{5-\sqrt{5}})/16$	$(-\sqrt{2}(\sqrt{3}-1)(\sqrt{5}+1) + 2(\sqrt{3}+1)\sqrt{5-\sqrt{5}})/16$
$72^\circ = 4\pi/10$	$\sqrt{2} \cdot \sqrt{5+\sqrt{5}}/4$	$(\sqrt{5}-1)/4$
$75^\circ = 5\pi/12$	$\sqrt{2}(\sqrt{3}+1)/4$	$\sqrt{2}(\sqrt{3}-1)/4$
$78^\circ = 13\pi/30$	$((\sqrt{5}-1) + \sqrt{6}\sqrt{5+\sqrt{5}})/8$	$(-\sqrt{3}(\sqrt{5}-1) + \sqrt{2}\sqrt{5+\sqrt{5}})/8$
$81^\circ = 9\pi/20$	$(\sqrt{2}(\sqrt{5}+1) + 2\sqrt{5-\sqrt{5}})/8$	$(\sqrt{2}(\sqrt{5}+1) - 2\sqrt{5-\sqrt{5}})/8$
$84^\circ = 7\pi/15$	$(\sqrt{3}(\sqrt{5}+1) + \sqrt{2}\sqrt{5-\sqrt{5}})/8$	$(-(\sqrt{5}+1) + \sqrt{6}\sqrt{5-\sqrt{5}})/8$
$87^\circ = 29\pi/60$	$(\sqrt{2}(\sqrt{3}-1)(\sqrt{5}-1) + 2(\sqrt{3}+1)\sqrt{5+\sqrt{5}})/16$	$(\sqrt{2}(\sqrt{3}+1)(\sqrt{5}-1) - 2(\sqrt{3}-1)\sqrt{5+\sqrt{5}})/16$
$90^\circ = \pi/2$	1	0

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