

### 3° の倍数角の三角比

$\theta$	$\sin \theta$	$\tan \theta$
0°	0	0
3°	$\frac{-(2 + \sqrt{3})(1 - \sqrt{5}) - \sqrt{2}\sqrt{5 + \sqrt{5}}}{4\sqrt{2}(1 + \sqrt{3})}$	$\frac{-\sqrt{2}(\sqrt{2} - \sqrt{5 - \sqrt{5}})}{1 + 2\sqrt{3} + \sqrt{5}}$
6°	$\frac{-(1 + \sqrt{5}) + \sqrt{6}\sqrt{5 - \sqrt{5}}}{8}$	$\frac{-\sqrt{2}(\sqrt{6} - \sqrt{5 + \sqrt{5}})}{1 + \sqrt{5}}$
9°	$\frac{1 + \sqrt{5} - \sqrt{2}\sqrt{5 - \sqrt{5}}}{4\sqrt{2}}$	$\frac{-\sqrt{2}(2\sqrt{2} - \sqrt{5 + \sqrt{5}})}{1 - \sqrt{5}}$
12°	$\frac{\sqrt{3}(1 - \sqrt{5}) + \sqrt{2}\sqrt{5 + \sqrt{5}}}{8}$	$\frac{\sqrt{2}(\sqrt{6} - \sqrt{5 - \sqrt{5}})}{3 + \sqrt{5}}$
15°	$\frac{-(1 - \sqrt{3})}{2\sqrt{2}}$	$2 - \sqrt{3}$
18°	$\frac{-(1 - \sqrt{5})}{4}$	$\frac{\sqrt{2}\sqrt{5 - \sqrt{5}}}{\sqrt{5}(1 + \sqrt{5})}$
21°	$\frac{(2 - \sqrt{3})(1 + \sqrt{5}) - \sqrt{2}\sqrt{5 - \sqrt{5}}}{4\sqrt{2}(1 - \sqrt{3})}$	$\frac{\sqrt{2}(\sqrt{2} - \sqrt{5 + \sqrt{5}})}{1 - 2\sqrt{3} - \sqrt{5}}$
24°	$\frac{\sqrt{3}(1 + \sqrt{5}) - \sqrt{2}\sqrt{5 - \sqrt{5}}}{8}$	$\frac{-\sqrt{2}(\sqrt{6} - \sqrt{5 + \sqrt{5}})}{3 - \sqrt{5}}$
27°	$\frac{1 - \sqrt{5} + \sqrt{2}\sqrt{5 + \sqrt{5}}}{4\sqrt{2}}$	$\frac{\sqrt{2}(2\sqrt{2} - \sqrt{5 - \sqrt{5}})}{1 + \sqrt{5}}$
30°	$\frac{1}{2}$	$\frac{1}{\sqrt{3}}$
33°	$\frac{-(2 + \sqrt{3})(1 - \sqrt{5}) + \sqrt{2}\sqrt{5 + \sqrt{5}}}{4\sqrt{2}(1 + \sqrt{3})}$	$\frac{\sqrt{2}(\sqrt{2} + \sqrt{5 - \sqrt{5}})}{1 + 2\sqrt{3} + \sqrt{5}}$
36°	$\frac{\sqrt{5 - \sqrt{5}}}{2\sqrt{2}}$	$\frac{\sqrt{2}\sqrt{5 - \sqrt{5}}}{1 + \sqrt{5}}$
39°	$\frac{(2 + \sqrt{3})(1 + \sqrt{5}) - \sqrt{2}\sqrt{5 - \sqrt{5}}}{4\sqrt{2}(1 + \sqrt{3})}$	$\frac{-\sqrt{2}(\sqrt{2} - \sqrt{5 + \sqrt{5}})}{1 + 2\sqrt{3} - \sqrt{5}}$
42°	$\frac{1 - \sqrt{5} + \sqrt{6}\sqrt{5 + \sqrt{5}}}{8}$	$\frac{-\sqrt{2}(\sqrt{6} - \sqrt{5 - \sqrt{5}})}{1 - \sqrt{5}}$
45°	$\frac{1}{\sqrt{2}}$	1

$\theta$	$\sin \theta$	$\tan \theta$
$45^\circ$	$\frac{1}{\sqrt{2}}$	1
$48^\circ$	$\frac{-\sqrt{3}(1-\sqrt{5})+\sqrt{2}\sqrt{5+\sqrt{5}}}{8}$	$\frac{\sqrt{2}(\sqrt{6}+\sqrt{5-\sqrt{5}})}{3+\sqrt{5}}$
$51^\circ$	$\frac{-(2-\sqrt{3})(1+\sqrt{5})-\sqrt{2}\sqrt{5-\sqrt{5}}}{4\sqrt{2}(1-\sqrt{3})}$	$\frac{-\sqrt{2}(\sqrt{2}+\sqrt{5+\sqrt{5}})}{1-2\sqrt{3}-\sqrt{5}}$
$54^\circ$	$\frac{1+\sqrt{5}}{4}$	$\frac{-\sqrt{2}\sqrt{5+\sqrt{5}}}{\sqrt{5}(1-\sqrt{5})}$
$57^\circ$	$\frac{-(2-\sqrt{3})(1-\sqrt{5})-\sqrt{2}\sqrt{5+\sqrt{5}}}{4\sqrt{2}(1-\sqrt{3})}$	$\frac{\sqrt{2}(\sqrt{2}-\sqrt{5-\sqrt{5}})}{1-2\sqrt{3}+\sqrt{5}}$
$60^\circ$	$\frac{\sqrt{3}}{2}$	$\sqrt{3}$
$63^\circ$	$\frac{-(1-\sqrt{5})+\sqrt{2}\sqrt{5+\sqrt{5}}}{4\sqrt{2}}$	$\frac{\sqrt{2}(2\sqrt{2}+\sqrt{5-\sqrt{5}})}{1+\sqrt{5}}$
$66^\circ$	$\frac{1+\sqrt{5}+\sqrt{6}\sqrt{5-\sqrt{5}}}{8}$	$\frac{\sqrt{2}(\sqrt{6}+\sqrt{5+\sqrt{5}})}{1+\sqrt{5}}$
$69^\circ$	$\frac{(2+\sqrt{3})(1+\sqrt{5})+\sqrt{2}\sqrt{5-\sqrt{5}}}{4\sqrt{2}(1+\sqrt{3})}$	$\frac{\sqrt{2}(\sqrt{2}+\sqrt{5+\sqrt{5}})}{1+2\sqrt{3}-\sqrt{5}}$
$72^\circ$	$\frac{\sqrt{5+\sqrt{5}}}{2\sqrt{2}}$	$\frac{-\sqrt{2}\sqrt{5+\sqrt{5}}}{1-\sqrt{5}}$
$75^\circ$	$\frac{1+\sqrt{3}}{2\sqrt{2}}$	$2+\sqrt{3}$
$78^\circ$	$\frac{-(1-\sqrt{5})+\sqrt{6}\sqrt{5+\sqrt{5}}}{8}$	$\frac{-\sqrt{2}(\sqrt{6}+\sqrt{5-\sqrt{5}})}{1-\sqrt{5}}$
$81^\circ$	$\frac{1+\sqrt{5}+\sqrt{2}\sqrt{5-\sqrt{5}}}{4\sqrt{2}}$	$\frac{-\sqrt{2}(2\sqrt{2}+\sqrt{5+\sqrt{5}})}{1-\sqrt{5}}$
$84^\circ$	$\frac{\sqrt{3}(1+\sqrt{5})+\sqrt{2}\sqrt{5-\sqrt{5}}}{8}$	$\frac{\sqrt{2}(\sqrt{6}+\sqrt{5+\sqrt{5}})}{3-\sqrt{5}}$
$87^\circ$	$\frac{(2-\sqrt{3})(1-\sqrt{5})-\sqrt{2}\sqrt{5+\sqrt{5}}}{4\sqrt{2}(1-\sqrt{3})}$	$\frac{-\sqrt{2}(\sqrt{2}+\sqrt{5-\sqrt{5}})}{1-2\sqrt{3}+\sqrt{5}}$
$90^\circ$	1	-

$$2\sqrt{5+\sqrt{5}} = (1+\sqrt{5})\sqrt{5-\sqrt{5}}$$

$$2\sqrt{5-\sqrt{5}} = -(1-\sqrt{5})\sqrt{5+\sqrt{5}}$$

$$2\sqrt{2}\sqrt{5+2\sqrt{5}} = (1+\sqrt{5})\sqrt{5+\sqrt{5}}$$

$$2\sqrt{2}\sqrt{5-2\sqrt{5}} = -(1-\sqrt{5})\sqrt{5-\sqrt{5}}$$

$$2(1+2\sqrt{3}+\sqrt{5}) = -(1+\sqrt{3})(1-\sqrt{5})(\sqrt{3}+\sqrt{5})$$

$$2(1+2\sqrt{3}-\sqrt{5}) = -(1+\sqrt{3})(1+\sqrt{5})(\sqrt{3}-\sqrt{5})$$

$$2(1-2\sqrt{3}+\sqrt{5}) = (1-\sqrt{3})(1-\sqrt{5})(\sqrt{3}-\sqrt{5})$$

$$2(1-2\sqrt{3}-\sqrt{5}) = (1-\sqrt{3})(1+\sqrt{5})(\sqrt{3}+\sqrt{5})$$