

KEY

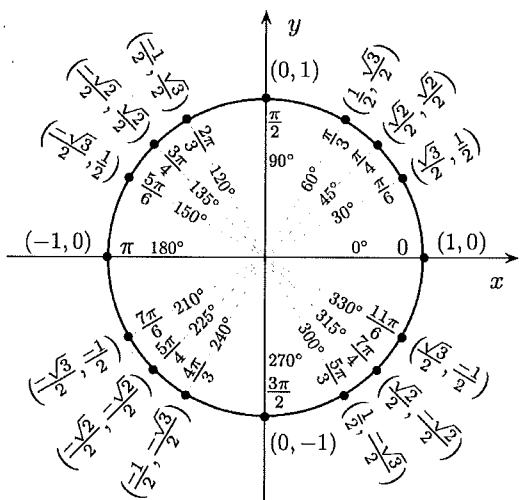
Name:

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Practice Worksheet: Trigonometric Equations

Solve each equation over $[0, 2\pi]$ by combining like terms. All answers must be exact in terms of pi.



<p>1] $\sin x + 2 = 3$ $\sin x = 1$ $x = \frac{\pi}{2}$</p>	<p>4] $\sqrt{3} \tan x + 1 = 0$ $\tan x = -\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$ $x = \frac{5\pi}{6}, \frac{11\pi}{6}$</p>
<p>2] $4 \sec x + 8 = 0$ $\sec x = -2$ $\cos x = -\frac{1}{2}$ $x = \frac{2\pi}{3}, \frac{4\pi}{3}$</p>	<p>5] $\cot x - \sqrt{3} = 0$ $\cot x = \sqrt{3}$ $\tan x = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$ $x = \frac{\pi}{6}, \frac{7\pi}{6}$</p>
<p>3] $18 \cos x - 9\sqrt{3} = 0$ $\cos x = \frac{9\sqrt{3}}{18} = \frac{\sqrt{3}}{2}$ $x = \frac{\pi}{6}, \frac{11\pi}{6}$</p>	<p>6] $8 \cos x - 4\sqrt{2} = 0$ $\cos x = \frac{4\sqrt{2}}{8} = \frac{\sqrt{2}}{2}$ $x = \frac{\pi}{4}, \frac{7\pi}{4}$</p>

Solve each equation over $[0, 2\pi]$ with the square root method. All answers must be exact in terms of pi.

<p>7] $\sec^2 x - 1 = 0$ $\sec^2 x = 1$ $\sec x = \pm 1$ $\cos x = \pm 1$ $x = 0, \pi, 2\pi$</p>	<p>10] $4 \cos^2 x - 1 = 0$ $\cos^2 x = \frac{1}{4}$ $\cos x = \pm \sqrt{\frac{1}{4}}$ $\cos x = \pm \frac{1}{2}$ $x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$</p>
<p>8] $2 \cos^2 x = 1$ $\cos^2 x = \frac{1}{2}$ $\cos x = \pm \sqrt{\frac{1}{2}}$ $= \pm \frac{1}{\sqrt{2}}$ $= \pm \frac{\sqrt{2}}{2}$ $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$</p>	<p>11] $4 \sin^2 x + 5 = 6$ $\sin^2 x = \frac{1}{4}$ $\sin x = \pm \sqrt{\frac{1}{4}}$ $\sin x = \pm \frac{1}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$</p>
<p>9] $3 \tan^2 x - 9 = 0$ $\tan^2 x = 3$ $\tan x = \pm \sqrt{3}$ $x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$</p>	<p>12] $3 \sec^2 x - 4 = 0$ $\sec^2 x = \frac{4}{3}$ $\sec x = \pm \sqrt{\frac{4}{3}}$ $\sec x = \pm \frac{2}{\sqrt{3}}$ $\cos x = \pm \frac{\sqrt{3}}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$</p>

Solve each equation over $[0, 2\pi]$ by factoring. All answers must be exact in terms of pi.

<p>13] $\sin^2 x - 3 \sin x + 2 = 0$</p> $(\sin x - 2)(\sin x - 1) = 0$ $\sin x - 2 = 0 \quad \sin x - 1 = 0$ $\sin x = 2 \quad \sin x = 1$ <p>NEVER $x = \frac{\pi}{2}$</p>	<p>17] $\cot^2 x = -2 \cot x - 1$</p> $\cot^2 x + 2 \cot x + 1 = 0$ $(\cot x + 1)(\cot x + 1) = 0$ $\cot x + 1 = 0$ $\cot x = -1$ $\tan x = -1$ <p>$x = \frac{3\pi}{4}, \frac{7\pi}{4}$</p>
<p>14] $\sin^2 x \cos x = \cos x$</p> $\sin^2 x \cos x - \cos x = 0$ $\cos x (\sin^2 x - 1) = 0$ $\cos x = 0 \quad \sin^2 x - 1 = 0$ <p>$x = \frac{\pi}{2}, \frac{3\pi}{2}$ $\sin^2 x = 1$</p> <p>$\sin x = \pm 1$</p> <p>$x = \frac{\pi}{2}, \frac{3\pi}{2}$ ← SAME</p>	<p>18] $\sin x - 2 \sin x \cos x = 0$</p> $\sin x (1 - 2 \cos x) = 0$ $\sin x = 0 \quad 1 - 2 \cos x = 0$ <p>$x = 0, \pi, 2\pi$ $\cos x = \frac{1}{2}$</p> <p>$x = \frac{\pi}{3}, \frac{5\pi}{3}$</p>
<p>15] $2 \cos^2 x - \sqrt{3} \cos x = 0$</p> $\cos x (2 \cos x - \sqrt{3}) = 0$ $\cos x = 0 \quad 2 \cos x - \sqrt{3} = 0$ <p>$x = \frac{\pi}{2}, \frac{3\pi}{2}$ $\cos x = \frac{\sqrt{3}}{2}$</p> <p>$x = \frac{\pi}{6}, \frac{11\pi}{6}$</p>	<p>19] $\sec x \csc x = 2 \csc x$</p> $\sec x \csc x - 2 \csc x = 0$ $\csc x (\sec x - 2) = 0$ $\csc x = 0 \quad \sec x - 2 = 0$ <p>Never $\sec x = 2$</p> <p>$\cos x = \frac{1}{2}$</p> <p>$x = \frac{\pi}{3}, \frac{5\pi}{3}$</p>
<p>16] $2 \sin^2 x + \sin x = 1$</p> $2 \sin^2 x + \sin x - 1 = 0$ $(2 \sin x - 1)(\sin x + 1) = 0$ $2 \sin x - 1 = 0 \quad \sin x + 1 = 0$ $\sin x = \frac{1}{2} \quad \sin x = -1$ <p>$x = \frac{\pi}{6}, \frac{5\pi}{6}$ $x = \frac{3\pi}{2}$</p>	<p>20] $\tan x \csc x - 2 \tan x = 0$</p> $\tan x (\csc x - 2) = 0$ $\tan x = 0 \quad \csc x - 2 = 0$ <p>$x = 0, \pi, 2\pi$ $\csc x = 2$</p> <p>$\sin x = \frac{1}{2}$</p> <p>$x = \frac{\pi}{6}, \frac{5\pi}{6}$</p>