

# KEY

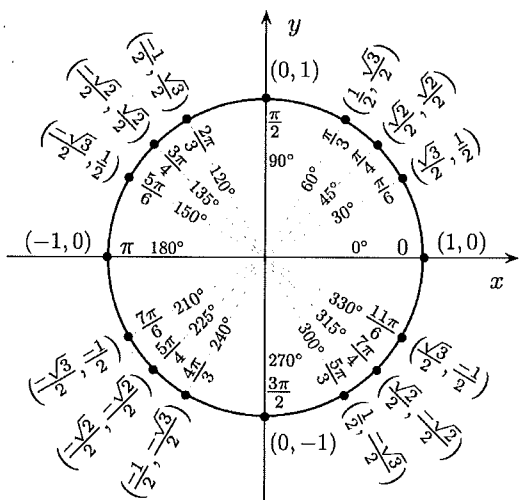
Name:

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

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

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

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

<p>13] <math>\sin^2 x - 3 \sin x + 2 = 0</math></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 <math>x = \frac{\pi}{2}</math></p>	<p>17] <math>\cot^2 x = -2 \cot x - 1</math></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><math>x = \frac{3\pi}{4}, \frac{7\pi}{4}</math></p>
<p>14] <math>\sin^2 x \cos x = \cos x</math></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><math>x = \frac{\pi}{2}, \frac{3\pi}{2}</math> <math>\sin^2 x = 1</math></p> <p><math>\sin x = \pm 1</math></p> <p><del>SAME</del> <math>x = \frac{\pi}{2}, \frac{3\pi}{2}</math></p>	<p>18] <math>\sin x - 2 \sin x \cos x = 0</math></p> $\sin x (1 - 2 \cos x) = 0$ $\sin x = 0 \quad 1 - 2 \cos x = 0$ <p><math>x = 0, \pi, 2\pi</math> <math>\cos x = \frac{1}{2}</math></p> <p><math>x = \frac{\pi}{3}, \frac{5\pi}{3}</math></p>
<p>15] <math>2 \cos^2 x - \sqrt{3} \cos x = 0</math></p> $\cos x (2 \cos x - \sqrt{3}) = 0$ $\cos x = 0 \quad 2 \cos x - \sqrt{3} = 0$ <p><math>x = \frac{\pi}{2}, \frac{3\pi}{2}</math> <math>\cos x = \frac{\sqrt{3}}{2}</math></p> <p><math>x = \frac{\pi}{6}, \frac{11\pi}{6}</math></p>	<p>19] <math>\sec x \csc x = 2 \csc x</math></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 <math>\sec x = 2</math></p> <p><math>\cos x = \frac{1}{2}</math></p> <p><math>x = \frac{\pi}{3}, \frac{5\pi}{3}</math></p>
<p>16] <math>2 \sin^2 x + \sin x = 1</math></p> $2 \sin^2 x + \sin x - 1 = 0$ $(2 \sin x - 1)(\sin x + 1) = 0$ $2 \sin x - 1 = 0 \quad \sin x + 1 = 0$ <p><math>\sin x = \frac{1}{2}</math> <math>\sin x = -1</math></p> <p><math>x = \frac{\pi}{6}, \frac{5\pi}{6}</math> <math>x = \frac{3\pi}{2}</math></p>	<p>20] <math>\tan x \csc x - 2 \tan x = 0</math></p> $\tan x (\csc x - 2) = 0$ $\tan x = 0 \quad \csc x - 2 = 0$ <p><math>x = 0, \pi, 2\pi</math> <math>\csc x = 2</math></p> <p><math>\sin x = \frac{1}{2}</math></p> <p><math>x = \frac{\pi}{6}, \frac{5\pi}{6}</math></p>