

Solving More Trig Equations WS

Solve the following equations. For the trig equations, solve over $[0, 2\pi)$. Circle your final answers.

| | |
|--|---|
| <p>1. $3x^2 + 5x = 0$ $x(3x+5) = 0$ $x = 0$ $3x+5=0$ $3x = -5$ $x = -\frac{5}{3}$</p> | <p>2. $x^2 - 3x - 28 = 0$ $(x-7)(x+4) = 0$ $x-7=0$ $x+4=0$ $x = 7, -4$</p> |
| <p>3. $2x^2 + 3x = 5$ $2x^2 + 3x - 5 = 0$ $(2x+5)(x-1) = 0$ $2x+5=0$ $x-1=0$ $2x = -5$ $x = 1$ $x = -\frac{5}{2}$</p> | <p>4. $8x^2 = 6x$ $8x^2 - 6x = 0$ $2x(4x-3) = 0$ $2x=0$ $4x-3=0$ $x=0$ $4x=3$ $x = \frac{3}{4}$</p> |
| <p>5. $2x^2 + 7x + 6 = 0$ $(2x+3)(x+2) = 0$ $2x+3=0$ $x+2=0$ $2x = -3$ $x = -2$ $x = -\frac{3}{2}$</p> | <p>6. $3x^2 = 13x - 4$ $3x^2 - 13x + 4 = 0$ $(3x-1)(x-4) = 0$ $3x-1=0$ $x-4=0$ $3x = 1$ $x = 4$ $x = \frac{1}{3}$</p> |
| <p>7. $5 = 10\cos^2 x$ $10\cos^2 x - 5 = 0$ $5(2\cos^2 x - 1) = 0$ $2\cos^2 x - 1 = 0$ $2\cos^2 x = 1$ $\cos^2 x = \frac{1}{2}$ $\cos x = \pm\sqrt{\frac{1}{2}} = \pm\frac{\sqrt{2}}{2}$ $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$</p> | <p>8. $4\sin x = \sqrt{3} + 2\sin x$ $2\sin x = \sqrt{3}$ $\sin x = \frac{\sqrt{3}}{2}$ $x = \frac{\pi}{3}, \frac{2\pi}{3}$</p> |
| <p>9. $3\sin^2 x = \cos^2 x$ $3(1 - \cos^2 x) = \cos^2 x$ $3 - 3\cos^2 x = \cos^2 x$ $3 = 4\cos^2 x$ $\frac{3}{4} = \cos^2 x$ $\cos x = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$</p> | <p>10. $\sin x = \sin(-x) + 1$ $\sin x = -\sin x + 1$ $2\sin x = 1$ $\sin x = \frac{1}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}$</p> |
| <p>11. $4\cos x \sin^2 x = \cos x$ $4\cos x \sin^2 x - \cos x = 0$ $\cos x(4\sin^2 x - 1) = 0$ $\cos x = 0$ $4\sin^2 x - 1 = 0$ $x = \frac{\pi}{2}, \frac{3\pi}{2}$ $4\sin^2 x = 1$ $\sin^2 x = \frac{1}{4}$ $\sin x = \pm\sqrt{\frac{1}{4}} = \pm\frac{1}{2}$ $x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$</p> | <p>12. $\cot^2 x = \sqrt{3}\cot x$ $\cot^2 x - \sqrt{3}\cot x = 0$ $\cot x(\cot x - \sqrt{3}) = 0$ $\cot x = 0$ $\cot x - \sqrt{3} = 0$ $\tan x = \text{und.}$ $\cot x = \sqrt{3}$ $x = \frac{\pi}{2}, \frac{3\pi}{2}$ $\tan x = \frac{1}{\sqrt{3}}$ $x = \frac{\pi}{6}, \frac{7\pi}{6}$</p> |
| <p>13. $2\cos^2 x - \cos x = 1$ $2\cos^2 x - \cos x - 1 = 0$ $(2\cos x + 1)(\cos x - 1) = 0$ $2\cos x + 1 = 0$ $\cos x - 1 = 0$ $2\cos x = -1$ $\cos x = 1$ $\cos x = -\frac{1}{2}$ $x = 0$ $x = \frac{2\pi}{3}, \frac{4\pi}{3}$</p> | <p>14. $\sin^2 x = 2\cos x + 2$ $1 - \cos^2 x = 2\cos x + 2$ $0 = \cos^2 x + 2\cos x + 1$ $(\cos x + 1)(\cos x + 1) = 0$ $\cos x + 1 = 0$ $\cos x = -1$ $x = \pi$</p> |
| <p>15. $\sec^2 x = \tan x + 1$ $\sec^2 x - 1 = \tan x$ $\tan^2 x = \tan x$ $\tan^2 x - \tan x = 0$ $\tan x(\tan x - 1) = 0$ $\tan x = 0$ $\tan x - 1 = 0$ $x = 0, \pi$ $\tan x = 1$ $x = \frac{\pi}{4}, \frac{5\pi}{4}$</p> | <p>16. $3\cos x + 3 = 2\sin^2 x$ $3\cos x + 3 = 2(1 - \cos^2 x)$ $3\cos x + 3 = 2 - 2\cos^2 x$ $2\cos^2 x + 3\cos x + 1 = 0$ $(2\cos x + 1)(\cos x + 1) = 0$ $2\cos x + 1 = 0$ $\cos x + 1 = 0$ $2\cos x = -1$ $\cos x = -1$ $\cos x = -\frac{1}{2}$ $x = \frac{2\pi}{3}, \frac{4\pi}{3}$ $x = \pi$</p> |
| <p>17. $\cot^2 x + \csc^2 x = 3$ $\cot^2 x + 1 + \cot^2 x = 3$ $2\cot^2 x + 1 = 3$ $2\cot^2 x = 2$ $\cot^2 x = 1$ $\cot x = \pm 1$ $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$</p> | <p>18. $2\sin^2 x = 3 - 3\cos x$ $2(1 - \cos^2 x) = 3 - 3\cos x$ $2 - 2\cos^2 x = 3 - 3\cos x$ $0 = 2\cos^2 x - 3\cos x + 1$ $0 = (2\cos x - 1)(\cos x - 1)$ $2\cos x - 1 = 0$ $\cos x - 1 = 0$ $2\cos x = 1$ $\cos x = 1$ $\cos x = \frac{1}{2}$ $x = \frac{\pi}{3}, \frac{5\pi}{3}$ $x = 0$</p> |
| <p>19. $3\tan^2 x + 4\sec x = -4$ $3(\sec^2 x - 1) + 4\sec x = -4$ $3\sec^2 x - 3 + 4\sec x + 4 = 0$ $3\sec^2 x + 4\sec x + 1 = 0$ $(3\sec x + 1)(\sec x + 1) = 0$ $3\sec x + 1 = 0$ $\sec x + 1 = 0$ $3\sec x = -1$ $\sec x = -1$ $\sec x = -\frac{1}{3}$ $\sec x = -1$ $\cos x = -3$ $\cos x = -1$ NA $x = \pi$</p> | <p>20. $\sec^2 x = 2\tan x$ $1 + \tan^2 x = 2\tan x$ $\tan^2 x - 2\tan x + 1 = 0$ $(\tan x - 1)(\tan x - 1) = 0$ $\tan x - 1 = 0$ $\tan x = 1$ $x = \frac{\pi}{4}, \frac{5\pi}{4}$</p> |
| <p>21. $3\cos x + \sqrt{2} = \cos x$ $2\cos x + \sqrt{2} = 0$ $2\cos x = -\sqrt{2}$ $\cos x = -\frac{\sqrt{2}}{2}$ $x = \frac{3\pi}{4}, \frac{5\pi}{4}$</p> | <p>22. $2\cos x \csc x = \sqrt{3}\csc x$ $2\cos x \csc x - \sqrt{3}\csc x = 0$ $\csc x(2\cos x - \sqrt{3}) = 0$ $\csc x = 0$ $2\cos x - \sqrt{3} = 0$ NA $2\cos x = \sqrt{3}$ $\cos x = \frac{\sqrt{3}}{2}$ $x = \frac{\pi}{6}, \frac{11\pi}{6}$</p> |

1 + 1

$\frac{\sqrt{3}}{2}$