☐ your homework

Trigonometry Section 3.6

In Exercises 1 to 22, solve each equation for exact solutions in the interval $0 \le x \le 2\pi$

2. $2sinx = \sqrt{3}$

$\sin x = \frac{\sqrt{3}}{2}$

$\boxed{x = \frac{\pi}{3}, \frac{2\pi}{3}}$

6. $2\,sinx\,cosx = \sqrt{3}\,sinx$

$2\sin x\cos x - \sqrt{3}\sin x = 0$

$\sin x(2\cos x - \sqrt{3}) = 0$

$\sin x = 0 \qquad 2\cos x - \sqrt{3} = 0$

$\cos x = \frac{\sqrt{3}}{2}$

$\boxed{0, \pi \qquad \frac{\pi}{6}, \frac{11\pi}{6}}$

9. $4\,sinx\,cosx - 2\sqrt{3}\,sinx - 2\sqrt{2}\cos x + \sqrt{6} = 0$

$2\sin x(2\cos x - \sqrt{3}) - \sqrt{2}(2\cos x - \sqrt{3})$

$(2\sin x - \sqrt{2})(2\cos x - \sqrt{3}) = 0$

$\sin x = \frac{\sqrt{2}}{2}$ $\boxed{\frac{\pi}{4}, \frac{3\pi}{4}}$ $\rightarrow \cos x = \frac{\sqrt{3}}{2}$ $\boxed{\frac{\pi}{6}, \frac{11\pi}{6}}$

$\boxed{10.}$ $sec^2x + \sqrt{3}\sec x - \sqrt{2}\sec x - \sqrt{6} = 0$

13. $2\,sin^2x + 1 = 3\,sinx$

$2\sin^2 x - 3\sin x + 1 = 0$

$(2\sin x - 1)(\sin x - 1) = 0$

$\sin x = \frac{1}{2} \qquad \sin x = 1$

$\boxed{\frac{\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}}$

16. $2\,sin^2x - 1 = 0$

$2\sin^2 x = 1$

$\sin^2 x = \frac{1}{2}$

$\sin x = \frac{\sqrt{2}}{2}$

$\boxed{\frac{\pi}{4}, \frac{3\pi}{4}}$

19. $4sin^2x + 2\sqrt{3}\,sinx - \sqrt{3} = 2\,sinx$

$4\sin^2 x + 2\sqrt{3}\sin x - \sqrt{3} - 2\sin x$

$2\sin x(2\sin x + \sqrt{3}) - 1(\sqrt{3} + 2\sin x)$

$(2\sin x - 1)(2\sin x + \sqrt{3}) = 0$

$\sin x = \frac{1}{2} \qquad \sin x = -\frac{\sqrt{3}}{2}$

$\boxed{\frac{\pi}{6}, \frac{5\pi}{6} \qquad \frac{4\pi}{3}, \frac{5\pi}{3}}$

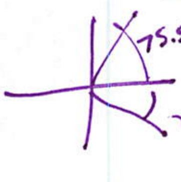
In Exercises 23 to 60, solve each equation, where $\boxed{0° \le x < 360°}$.
Round approximate solutions to the nearest tenth of a degree.

26. $4\,cosx - 1 = 0$

$4\cos x = 1$

$\cos x = \frac{1}{4}$

$\boxed{x \simeq 75.5°, 284.5°}$



cos is positive in both quadrants

$\rightarrow 360 - 75.5° = 284.5°$

36. $4\,cot^2x + 3\,cotx = 0$

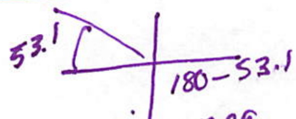
$\cot x(4\cot x + 3) = 0$

$\cot x = 0 \qquad \cot x = -\frac{3}{4}$

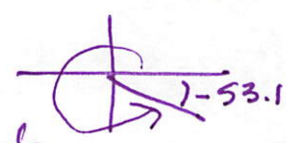
$\tan x = -\frac{4}{3}$

$x = -53.1°$

$\boxed{126.9°, 306.9°}$



tan is neg in 2nd quad.



$360 - 53.1 = 306.9°$

49. $2\,sinx\,cosx - sinx - 2\,cosx + 1 = 0$

$\sin x(2\cos x - 1) - 1(2\cos x - 1) = 0$

$(\sin x - 1)(2\cos x - 1) = 0$

$\sin x = 1 \qquad \cos x = 1/2$

$\sin x = 1 \qquad \cos x = \frac{1}{2}$

$\boxed{\frac{\pi}{2} \qquad \frac{\pi}{3}, \frac{5\pi}{3}}$

59. $cos^2x - 3\,sinx + 2\,sin^2x = 0$

$\cos^2 x + \sin^2 x + \sin^2 x - 3\sin x = 0$

$1 + \sin^2 x - 3\sin x = 0$

$\sin^2 x - 3\sin x + 1 = 0$ (Doesn't factor use Quadratic formula)

$\sin x = \frac{3 \pm \sqrt{9-4}}{2} = \frac{3 \pm \sqrt{5}}{2}$

$\frac{3 \cancel{+} \sqrt{5}}{2}$ no sol.

$\boxed{\frac{3-\sqrt{5}}{2} \quad 22.5^\circ \quad 157.5^\circ}$

$\boxed{27.}$ $3\sec x - 8 = 0$

$\boxed{39.}$ $tan^2x = 3\,sec^2x - 2$

$\boxed{45.}$ $2tan^2x - \tan x - 10 = 0$

In Exercises 61 to 70, find the exact solutions, in radians, of each trigonometric equation.

66. $cos2x = -\frac{\sqrt{3}}{2}$

$2x = \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

$2x = \frac{5\pi}{6}$

$\boxed{x = \frac{5\pi}{12}}$

$\boxed{69.}$ $sin^2\frac{x}{2} + \cos x = 1$

In Exercises 71 to 84, find the exact solutions, where $0 \le x < 2\pi$.

$1 + \cos x \ne 0 \qquad \boxed{x \ne \pi}$

76. $tan\frac{x}{2} = 1 - cosx$

$\frac{\sin x}{1 + \cos x} = 1 - \cos x$

$\sin x = (1 - \cos x)(1 + \cos x)$

$1 - \cos^2 x$

$\sin x = \sin^2 x$

$0 = \sin^2 x - \sin x$

$0 = \sin x(\sin x - 1)$

$\sin x = 0 \qquad \sin x = 1$

$0, \cancel{\pi} \qquad \frac{\pi}{2}$

$\boxed{0, \frac{\pi}{2}}$

78. $cos2x\,cosx - sin2x\,sinx = 0$

$\cos(2x + x) = 0$

$\cos 3x = 0$

$3x = \cos^{-1}(0)$

$3x = \pi/2$

$\boxed{x = \frac{\pi}{6}}$