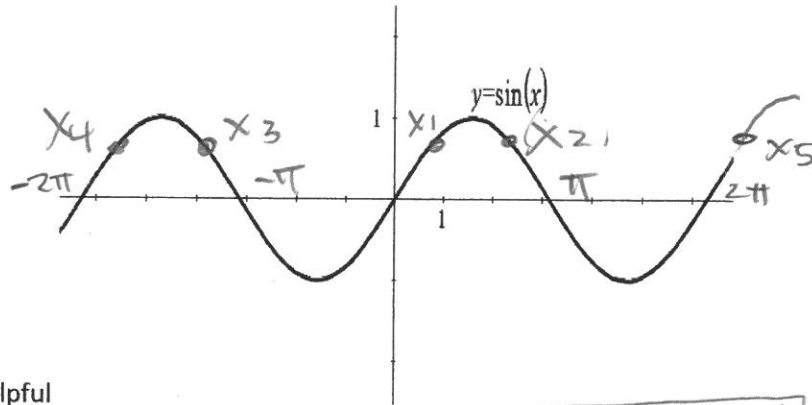


1. Solve the following trigonometric equation $\frac{-3}{4} \sin(x) + 2 = \frac{3}{2}$

Give three EXACT solutions and their approximations



This may be helpful

Show necessary work here

(A)
$$\frac{-3}{4} \sin x + 2 = \frac{3}{2} = \frac{3}{2} - \frac{4}{2}$$

(B)
$$\frac{-3}{4} \sin x = -\frac{1}{2}$$

$$\frac{-4}{3} \left(\frac{-3}{4} \sin x \right) = \frac{-4}{3} \left(-\frac{1}{2} \right)$$

$$\sin x = \frac{4}{6}$$

(C)
$$\sin x = \frac{2}{3}$$

$$x_2 = \pi - \sin^{-1}\left(\frac{2}{3}\right)$$

$$\approx 2.412 \text{ radians}$$

$$x_3 = -\pi - \sin^{-1}\left(\frac{2}{3}\right)$$

$$\approx 3.871 \text{ radians}$$

$$x_4 = -2\pi + \sin^{-1}\left(\frac{2}{3}\right)$$

$$\approx -5.553 \text{ radians}$$

$$x_5 = 2\pi + \sin^{-1}\left(\frac{2}{3}\right)$$

$$\approx 7.013 \text{ radians}$$

$$x_1 = \sin^{-1}\left(\frac{2}{3}\right) \approx 0.730 \text{ radians}$$

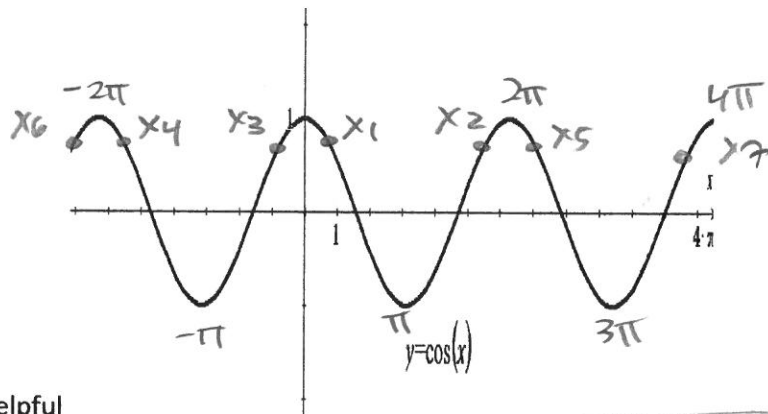
Exact Solution #1 $\sin^{-1}\left(\frac{2}{3}\right)$ Approximation (round to three decimals) 0.730

Exact Solution #2 $\pi - \sin^{-1}\left(\frac{2}{3}\right)$ Approximation (round to three decimals) 2.412

Exact Solution #3 $-\pi - \sin^{-1}\left(\frac{2}{3}\right)$ Approximation (round to three decimals) 3.871

2. Solve the following trigonometric equation $6\cos(x) - 2 = \frac{7}{2}$

Give three EXACT solutions and their approximations



This may be helpful

Show necessary work here

(A) $6\cos x - 2 = \frac{7}{2} = \frac{7}{2} + \frac{4}{2}$

(B) $6\cos x = \frac{11}{2}$

$\frac{6\cos x}{6} = \frac{11}{2} \cdot \frac{1}{6}$

(C) $\cos x = \frac{11}{12}$

$x_1 = \cos^{-1}\left(\frac{11}{12}\right) \approx 0.411 \text{ radians}$

$x_2 = 2\pi - \cos^{-1}\left(\frac{11}{12}\right) \approx 5.872 \text{ radians}$

$x_7 = 4\pi - \cos^{-1}\left(\frac{11}{12}\right) \approx 12.155 \text{ radians}$

$x_3 = -\cos^{-1}\left(\frac{11}{12}\right) \approx -0.411 \text{ radians}$

$x_4 = -2\pi + \cos^{-1}\left(\frac{11}{12}\right) \approx -5.872 \text{ radians}$

$x_5 = 2\pi + \cos^{-1}\left(\frac{11}{12}\right) \approx 6.694 \text{ radians}$

$x_6 = -2\pi - \cos^{-1}\left(\frac{11}{12}\right) \approx -6.694 \text{ radians}$

Exact Solution #1 $\cos^{-1}\left(\frac{11}{12}\right)$ Approximation (round to three decimals) 0.411

Exact Solution #2 $2\pi - \cos^{-1}\left(\frac{11}{12}\right)$ Approximation (round to three decimals) 5.872

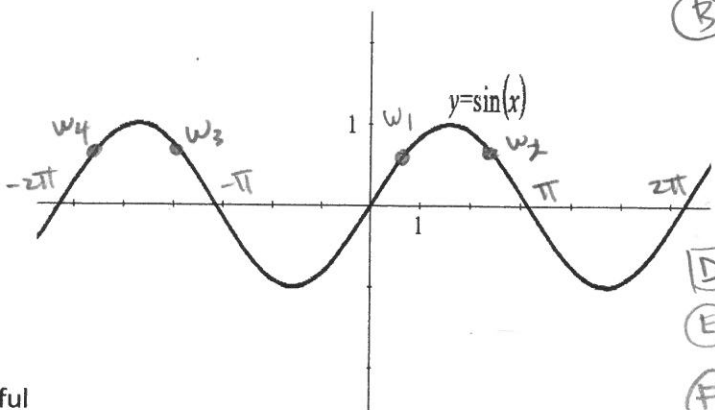
Exact Solution #3 $-\cos^{-1}\left(\frac{11}{12}\right)$ Approximation (round to three decimals) -0.411

let $w = \frac{1}{2}x + \frac{\pi}{4}$

3. Solve the following trigonometric equation $3\sin\left(\frac{1}{2}x + \frac{\pi}{4}\right) - 2 = \frac{1}{2}$

(A) $3\sin w - 2 = \frac{1}{2} = \frac{1}{2}$
 $\quad +2 \quad +2 \quad +\frac{4}{2}$

Give three EXACT solutions and their approximations



(B) $3\sin w = \frac{5}{2}$

$\frac{3\sin w}{3} = \frac{5}{2} \cdot \frac{1}{3}$

(C) $\sin w = \frac{5}{8}$

(D) $w_1 = \sin^{-1}\left(\frac{5}{8}\right)$

(E) $w_2 = \pi - \sin^{-1}\left(\frac{5}{8}\right)$

(F) $w_3 = -\pi - \sin^{-1}\left(\frac{5}{8}\right)$

(G) $w_4 = -2\pi + \sin^{-1}\left(\frac{5}{8}\right)$

This may be helpful

Show necessary work here

(D) $\frac{1}{2}x + \frac{\pi}{4} = \sin^{-1}\left(\frac{5}{8}\right)$

$\frac{-\pi}{4} \quad -\frac{\pi}{4}$
 $\frac{1}{2}x = -\frac{\pi}{4} + \sin^{-1}\left(\frac{5}{8}\right)$

$2\left(\frac{1}{2}x\right) = 2\left(-\frac{\pi}{4} + \sin^{-1}\left(\frac{5}{8}\right)\right)$

$x = -\frac{2\pi}{4} + 2\sin^{-1}\left(\frac{5}{8}\right)$

$x = -\frac{\pi}{2} + 2\sin^{-1}\left(\frac{5}{8}\right)$
 $x_1 \approx -0.221 \text{ radians}$

Exact Solution #1

Approximation (round to three decimals) -0.221

Exact Solution #2 $\frac{3\pi}{2} - 2\sin^{-1}\left(\frac{5}{8}\right)$

Approximation (round to three decimals) -6.063

Exact Solution #3 $-\frac{5\pi}{2} - 2\sin^{-1}\left(\frac{5}{8}\right)$

Approximation (round to three decimals) -9.204

(E) $\frac{1}{2}x + \frac{\pi}{4} = \pi - \sin^{-1}\left(\frac{5}{8}\right)$

$-\frac{\pi}{4} \quad -\frac{\pi}{4}$
 $\frac{1}{2}x = \frac{3\pi}{4} - \sin^{-1}\left(\frac{5}{8}\right)$

$2\left(\frac{1}{2}x\right) = \left(\frac{3\pi}{4} - \sin^{-1}\left(\frac{5}{8}\right)\right)2$

$x_2 = \frac{6\pi}{4} - 2\sin^{-1}\left(\frac{5}{8}\right)$

$x_2 = \frac{3\pi}{2} - 2\sin^{-1}\left(\frac{5}{8}\right) \approx -6.063 \text{ radians}$

$-\frac{\pi}{2} + 2\sin^{-1}\left(\frac{5}{8}\right)$

(F) $-\pi - \sin^{-1}\left(\frac{5}{8}\right) = \frac{1}{2}x_3 + \frac{\pi}{4}$
 $-\frac{\pi}{4} \quad -\frac{\pi}{4}$

$-\frac{5\pi}{4} - \sin^{-1}\left(\frac{5}{8}\right) = \frac{1}{2}x_3$

$2\left(-\frac{5\pi}{4} - \sin^{-1}\left(\frac{5}{8}\right)\right) = 2\left(\frac{1}{2}x_3\right)$

$-\frac{10\pi}{4} - 2\sin^{-1}\left(\frac{5}{8}\right) = x_3$

$x_3 = -\frac{5\pi}{2} - 2\sin^{-1}\left(\frac{5}{8}\right) \approx -9.204 \text{ radians}$

(G) $\frac{1}{2}x_4 + \frac{\pi}{4} = -2\pi + \sin^{-1}\left(\frac{5}{8}\right)$

$-\frac{\pi}{4} \quad -\frac{\pi}{4}$
 $\frac{1}{2}x_4 = -\frac{9\pi}{4} + \sin^{-1}\left(\frac{5}{8}\right)$

$2\left(\frac{1}{2}x_4\right) = 2\left(-\frac{9\pi}{4} + \sin^{-1}\left(\frac{5}{8}\right)\right)$

$x_4 = -\frac{18\pi}{4} + 2\sin^{-1}\left(\frac{5}{8}\right) = -\frac{9\pi}{2} + 2\sin^{-1}\left(\frac{5}{8}\right) \approx -12.787 \text{ radians}$

