

Solving Linear Trigonometric Equations

- Solve each of the following equations to two decimal places, $0 \leq \theta \leq 2\pi$.
 - $\sin \theta = 0.3124$
 - $\cos \theta = 0.7315$
 - $\tan \theta = 3.1571$
 - $\sin \theta = -0.8135$
 - $\cos \theta = -0.1476$
 - $\tan \theta = -0.3541$
- For parts d, e, and f of question 1, rewrite your answers if $\theta \in \mathbb{R}$.
- Solve each of the following equations. Give exact answers only, $0 \leq \theta \leq 2\pi$.
 - $\sin \theta = \frac{\sqrt{3}}{2}$
 - $\cos \theta = -\frac{1}{\sqrt{2}}$
 - $\tan \theta = \sqrt{3}$
 - $\csc \theta = -2$
 - $\tan \theta = -1$
 - $\cos \theta = \frac{1}{2}$
- Solve each of the following equations. State the exact answers if possible. Otherwise, write your answers correct to two decimal places. Be careful with the domain of the solutions.
 - $5 \tan x - 3 = 3 \tan x + 7, 0 \leq x \leq 2\pi$.
 - $7(\cos x + 5) = 13 + 3(\cos x + 8), 0 \leq x \leq 2\pi$.
 - $6 \sin(x) - 4 = 2 \sin(x) + 1, -\pi \leq x \leq \pi$.
 - $5 + 4 \cos x = 2, 0 \leq x \leq \pi$.
 - $4\sqrt{2} \tan x - 11 = \sqrt{2} \tan x - 9, \pi \leq x \leq 2\pi$
- Solve each of the following equations. State exact answers if possible. Otherwise, round your answers correctly to two decimal places.
 - $\sin\left(x + \frac{\pi}{4}\right) = \frac{\sqrt{3}}{2}, 0 \leq x \leq 2\pi$.
 - $5 \tan\left(x - \frac{\pi}{3}\right) + 3 = 1, 0 \leq x \leq 2\pi$.
 - $2 \cos\left(x + \frac{5\pi}{6}\right) + 4 = 3, 0 \leq x \leq 2\pi$.
- Solve for $x, 0 \leq x \leq 2\pi$. Give exact answers.
 - $(2 \sin x + 1)(\cos x - 1) = 0$
 - $4 \cos^2 x - 1 = 0$

Answers: 1. a) 0.32, 2.82 b) 0.75, 5.53 c) 1.26, 4.41 d) 4.09, 5.33

e) 1.72, 4.56 f) 2.80, 5.94 2. d) $4.09 + 2k\pi, 5.33 + 2k\pi, k \in \mathbb{I}$

e) $1.72 + 2k\pi, 4.56 + 2k\pi, k \in \mathbb{I}$ f) $2.80 + k\pi, 5.94 + k\pi, k \in \mathbb{I}$

3. a) $\left\{\frac{\pi}{3}, \frac{2\pi}{3}\right\}$ b) $\left\{\frac{3\pi}{4}, \frac{5\pi}{4}\right\}$ c) $\left\{\frac{\pi}{3}, \frac{4\pi}{3}\right\}$ d) $\left\{\frac{7\pi}{6}, \frac{11\pi}{6}\right\}$ e) $\left\{\frac{3\pi}{4}, \frac{7\pi}{4}\right\}$ f) $\left\{\frac{\pi}{3}, \frac{5\pi}{3}\right\}$

4. a) 1.37, 4.51 b) $\left\{\frac{\pi}{3}, \frac{5\pi}{3}\right\}$ c) no solution d) 2.42 e) 3.58

5. a) $\left\{\frac{\pi}{12}, \frac{5\pi}{12}\right\}$ b) 0.67, 3.81 c) $\left\{\frac{\pi}{2}, \frac{11\pi}{6}\right\}$ 6. a) $\left\{0, \frac{7\pi}{6}, \frac{11\pi}{6}, 2\pi\right\}$ b) $\left\{\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}\right\}$