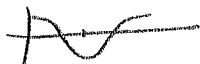


① $\cos(x) + 1 = 0$

⊗ Isolate

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

Quadrantal



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

②. $2\sin(x) - 3 = -4$

⊗ Isolate: +3 +3

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

$$\Rightarrow \sin(x) = -1/2$$

⊗ Quadrant Check:

QIII QIII

⊗ Ref $\times$:

$$x_R = \pi/6$$

⊗ Solve: QIII QIII

$$\boxed{x = 7\pi/6 \quad x = 11\pi/6}$$

③. $4\cos^2(x) + 7 = 10$

⊗ Isolate

$$\Rightarrow 4\cos^2(x) = 3$$

$$\Rightarrow \cos^2(x) = \frac{3}{4}$$

$$\Rightarrow \cos(x) = \pm \sqrt{\frac{3}{4}} = \pm \frac{\sqrt{3}}{2}$$

$$\Rightarrow \cos(x) = \pm \frac{\sqrt{3}}{2}$$

⊗ Quad. Check:

all 4 Quads.

⊗ Ref $\times$:

$$x_R = \pi/6$$

⊗ Solve:

QI	QII	QIII	QIV
$x = \pi/6$	$x = 5\pi/6$	$x = 7\pi/6$	$x = 11\pi/6$

④ $\sec(x) \tan(x) + \tan(x) = 0$

Functions are multiplied
SO Factor:

$$\Rightarrow \tan(x) (\sec(x) + 1) = 0$$

$$\Rightarrow \tan(x) = 0 \quad \text{OR} \quad \sec(x) + 1 = 0$$

⊗ Quadrantal

$$\boxed{x = 0, x = \pi}$$

⊗ Isolate

$$\Rightarrow \sec(x) = -1$$

Reciprocal

$$\Rightarrow \cos(x) = -1$$

⊗ Quadrantal

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

#5. $5\cot(x) + 14.5 = 12.6$
 * Isolate -14.5 -14.5

$\Rightarrow 5\cot(x) = -1.9$

$\Rightarrow \cot(x) = -\frac{1.9}{5}$

$\Rightarrow \cot(x) = -.38$

Reciprocals

$\Rightarrow \tan(x) = -2.63157\dots$
 ≈ -2.632

* Quadrant check:

QII QIII

* Ref x :

$\Rightarrow x_R = \tan^{-1}(2.63157\dots)$

$\Rightarrow x_R = 1.20764\dots$

$\Rightarrow x_R \approx 1.208$

* Solve.

QII

1.208 
 $x = \pi - 1.208$
 ≈ 1.934

QIII


 $x = 2\pi - 1.208$
 ≈ 5.076

$x = 1.934$ or $x = 5.076$

#6. $5\csc(x) + 10 = 0$

* Isolate:

$\Rightarrow 5\csc(x) = -10$

$\Rightarrow \csc(x) = -2$

* Reciprocals

$\Rightarrow \sin(x) = -\frac{1}{2}$

* Quad check

QIII QIV

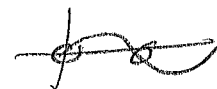
* Ref x :

$x_R = \pi/6$

* Solve: $x = 7\pi/6$ $x = 11\pi/6$

#7. $\sin(x) = 0$

* Quadrantal



$x = 0$ $x = \pi$

$$9. \sqrt{3} \tan(x) - 1 = 0$$

⊕ Isolate:

$$\Rightarrow \sqrt{3} \tan(x) = 1$$

$$\Rightarrow \tan(x) = \frac{1}{\sqrt{3}}$$

⊕ Quad check:

Q I Q III

⊕ Ref 4:

$$x_R = \pi/6$$

⊕ solve:

$$x = \pi/6 \quad x = 7\pi/6$$

$$10. \sin(x) + \sin(2x) = 0$$

mixed Angles use identity

$$\sin(2x) = 2 \sin(x) \cos(x)$$

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

⊕ Factor

$$\Rightarrow \sin(x) (1 + 2 \cos(x)) = 0$$

$$\sin(x) = 0 \quad \text{OR}$$

$$1 + 2 \cos(x) = 0$$

⊕ Quadrantal

$$x = 0 \\ x = \pi$$

⊕ Isolate:

$$\cos(x) = -\frac{1}{2}$$

⊕ Quad. Check:

Q II Q III

⊕ Ref 4:

$$x_R = \pi/3$$

⊕ solve

$$x = 2\pi/3 \\ x = 4\pi/3$$

MULTIPLE
ANGLE!

$$9. \cos(2x) + 3 = 3$$

⊕ Isolate:

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

⊕ Quadrantal

$$\Rightarrow \begin{cases} 2x = \pi/2 \\ 2x = 3\pi/2 \end{cases}$$

General sol'n

$$\Rightarrow \begin{cases} 2x = \frac{\pi}{2} \pm 2\pi n \\ 2x = \frac{3\pi}{2} \pm 2\pi n \end{cases}$$

⊕ multiply thru by $\frac{1}{2}$

$$\Rightarrow \begin{cases} x = \frac{\pi}{4} \pm \frac{2\pi n}{2} \\ x = \frac{3\pi}{4} \pm \frac{2\pi n}{2} \end{cases}$$

⊕ common denominator

$$\Rightarrow \begin{cases} x = \frac{\pi}{4} \pm \frac{4\pi n}{4} \\ x = \frac{3\pi}{4} \pm \frac{4\pi n}{4} \end{cases}$$

Let $n=0$

$n=1$

$$\begin{array}{cc} x = \pi/4 & x = 5\pi/4 \\ x = 3\pi/4 & x = 7\pi/4 \end{array}$$

$[0, 2\pi)$

use

$[0, \frac{8\pi}{4})$

$n=2$

$$x = 9\pi/4$$

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