

#13 $2\sin(\theta) + 3 = 2$

* Isolate

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

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

* Quadrant Check

NOTE: $\sin(\theta)$ IS NEGATIVE

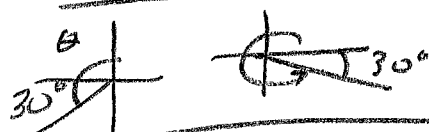
Q III Q IV

* Reference Angle:

$$\sin(\theta_R) = \frac{1}{2}$$

$$\Rightarrow \theta_R = 30^\circ$$

* SOLVE



$$\boxed{x = 210^\circ \quad x = 330^\circ}$$

OOPS I DID DEGREES
WE WANT RADIANS

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

#17 $\tan(\theta) + 1 = 0$

* Isolate

$$\Rightarrow \tan(\theta) = -1$$

* Quadrant Check

$\tan(\theta)$ is negative

Q II Q III

* Ref $\angle$:

$$\theta_R = \pi/4$$

* Solve

$$\boxed{\theta = \frac{3\pi}{4} \quad \theta = \frac{7\pi}{4}}$$

NOTE:
We will
discuss
this in
more
detail
on
Thursday

#15

$$2\sin(\theta) + 1 = 0$$

* ISOLATE

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

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

* Quadrant Check

Q III Q IV

* Reference Angle

$$\theta_R = \pi/6$$

* SOLVE



$$x = 7\pi/6$$

$$x = 11\pi/6$$

#19 $4\sec(\theta) + 6 = -2$

* ISOLATE

$$\Rightarrow 4\sec(\theta) = -8$$

$$\Rightarrow \sec(\theta) = -2$$

* RECIPROCAL!

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

* Quadrant Check

$\Rightarrow$ Q II Q III

* Ref $\angle$:

$$\theta_R = \pi/3 (60^\circ)$$

* Solution

$$\boxed{\theta = 2\pi/3 \quad \theta = 4\pi/3}$$

#21

$$3\sqrt{2} \cos(\theta) + 2 = -1$$

⊗ Isolate:

$$3\sqrt{2} \cos(\theta) = -3$$

$$\Rightarrow \sqrt{2} \cos(\theta) = -1$$

$$\Rightarrow \cos(\theta) = \frac{-1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$

⊗ Quadrant Check $\Rightarrow$ QII QIII⊗ Reference Angle

$$\theta_R = \pi/4$$

⊗ Solve

$$\theta = \frac{3\pi}{4} \quad \theta = \frac{5\pi}{4}$$

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#23

$$4 \cos^2(\theta) = 1$$

⊗ Isolate:

$$\cos^2(\theta) = \frac{1}{4}$$

$$\Rightarrow \cos(\theta) = \pm \sqrt{\frac{1}{4}} = \pm \frac{1}{2}$$

⊗ Quadrant Check

QI, QII, QIII, QIV

⊗ Reference Angle

$$\theta_R = \pi/3$$

⊗ Solve

$$\theta = \pi/3, 2\pi/3, 4\pi/3, 5\pi/3$$

$$\#25. 2 \sin^2(\theta) - 1 = 0$$

⊗ Isolate

$$\Rightarrow 2 \sin^2(\theta) = 1$$

$$\Rightarrow \sin^2(\theta) = \frac{1}{2}$$

$$\Rightarrow \sin(\theta) = \pm \sqrt{\frac{1}{2}}$$

$$= \pm \frac{\sqrt{2}}{2}$$

$$= \pm \frac{1}{\sqrt{2}}$$

$$= \pm \frac{\sqrt{2}}{2}$$

⊗ Quadrant Check:

all four quadrants

⊗ Reference Angle

$$\theta_R = \pi/4$$

⊗ Solve

$$\theta = \pi/4, 3\pi/4, 5\pi/4, 7\pi/4$$

NOTES: #49-53 are in Radians

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#49. $\sin(\theta) = 0.4$

⊗ Isolate

DONE

⊗ Quadrant Check

QI QII

⊗ Reference Angle

$$\theta_R = \sin^{-1}(0.4)$$

Be sure your calculator is in RADIAN mode.

$$\Rightarrow \theta_R = .4115$$

⊗ Solve

QI $\theta = \theta_R$ $\Rightarrow \theta = .41$	QII $\theta = \pi - \theta_R$ $= \pi - .41$ $= 2.73$
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#53. $\cos(\theta) = -.9$

⊗ Isolate

DONE

⊗ Quadrant Check

QII QIII

⊗ Ref $\angle$:

$$\theta_R = \cos^{-1}(0.9)$$

$$\theta_R = .4510$$

⊗ Solve

QII $\theta = \pi - .4510$ $= 2.69$	QIII $\theta = \pi + .4510 = 3.59$
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#51. $\tan(\theta) = 5$

⊗ Isolate

DONE

⊗ Quadrant Check

QI QIII

⊗ Reference Angle

$$\tan(\theta_R) = 5$$

$$\Rightarrow \theta_R = \tan^{-1}(5)$$

$$\theta_R = 1.3734$$

⊗ Solve

QI $\theta = 1.37$	QIII $\theta = \pi + 1.37$ $= 4.51$
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#55. $\sec(\theta) = -4$

⊗ ISOLATE

DONE

⊗ Reciprocal

$$\Rightarrow \cos(\theta) = -\frac{1}{4}$$

⊗ Quadrant check

QII QIII

⊗ Ref $\angle$:

$$\theta_R = \cos^{-1}\left(\frac{1}{4}\right) = 1.3181$$

⊗ Solve

QII: $\theta = \pi - 1.3181 = 1.82$	QIII $\theta = \pi + 1.3181 = 4.46$
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#57 $5 \tan(\theta) + 9 = 0$ ANSWERS in Radians

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* Isolate:

$$5 \tan(\theta) = -9$$

$$\Rightarrow \tan(\theta) = -\frac{9}{5}$$

* Quadrant Check

QII QIII

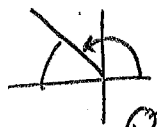
* Reference Angle

$$\theta_R = \tan^{-1}\left(\frac{9}{5}\right) = 1.0636 \dots$$

* Solve $= 1.06$

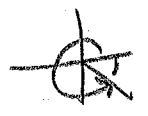
QII: $\theta = \pi - 1.06$

$= \boxed{2.08}$



QIII

$\theta = 2\pi - 1.06$
 $= \boxed{5.22}$



#61 $2 \cos^2(\theta) + \cos(\theta) = 0$

* Factor:

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

$\Rightarrow \cos(\theta) = 0$ or $2 \cos(\theta) + 1 = 0$

$\Rightarrow$ Quadrantal

* Isolate:

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

* Quadrant Check

QII QIII

* Ref A:

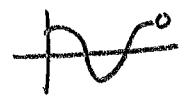
special angle
 $\cos(\theta) = \frac{1}{2} \Rightarrow \theta_R = \pi/3 (60^\circ)$

* Solve

QII $\theta = \pi - \pi/3 = \boxed{2\pi/3}$

QIII

$\theta = \pi + \pi/3 = \boxed{4\pi/3}$



#59 $3 \sin(\theta) - 2 = 0$

* Isolate

$$\Rightarrow 3 \sin(\theta) = 2$$

$$\Rightarrow \sin(\theta) = \frac{2}{3}$$

* Quadrant check

QI QII

* Reference Angle

$$\theta_R = \sin^{-1}\left(\frac{2}{3}\right) = .72972 \dots = .73$$

* Solve

QI: $\theta = .73$

QII:

$\theta = 3.14 - .73$
 $= \boxed{2.41}$

#63 $2 \sin(\theta) - \sin(\theta) - 1 = 0$

* Factor

$$(2 \sin(\theta) + 1)(\sin(\theta) - 1) = 0$$

$\Rightarrow 2 \sin(\theta) + 1 = 0$ or $\sin(\theta) = 1$ Quadrantal

* Isolate

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

$\theta = \pi/2$

* Quadrant Check

QIII QIV

* Reference Angle

special angle

$$\sin(\theta) = \frac{1}{2}$$

$$\Rightarrow \theta_R = \pi/6$$

* Solve

QIII

$\theta = \pi + \pi/6 = \boxed{7\pi/6}$

QIV

$\theta = 2\pi - \pi/6 = \boxed{11\pi/6}$

#65 $(\tan(\theta) - 1)(\sec(\theta) - 1) = 0$

⊗ Already factored

$\Rightarrow \tan(\theta) - 1 = 0$ or $\sec(\theta) = -1$

⊗ Isolate:

$\Rightarrow \tan(\theta) = 1$

⊗ Quadrant check

QI QII

⊗ Ref x:

special angle:

$\tan(\theta) = 1 \Rightarrow \theta_R = \pi/4 (45^\circ)$

QI
 $\boxed{\theta = \pi/4}$

QII
 $\theta = \pi - \pi/4$
 $= \boxed{3\pi/4}$

#67

pg 5ive

$\sin^2(\theta) - \cos^2(\theta) = 1 + \cos(\theta)$

must obtain a single function type $\Rightarrow$ since there is

" $\cos(\theta)$ " in the equation

convert $\sin^2(\theta)$ to $1 - \cos^2(\theta)$

$\Rightarrow (1 - \cos^2(\theta)) - \cos^2(\theta) = 1 + \cos(\theta)$

$\Rightarrow 1 - 2\cos^2(\theta) = 1 + \cos(\theta)$

$\Rightarrow -2\cos^2(\theta) = \cos(\theta)$

$\Rightarrow -2\cos^2(\theta) - \cos(\theta) = 0$

$\Rightarrow -2\cos^2(\theta) - \cos(\theta) = 0$

⊗ Factor

$\Rightarrow -\cos(\theta) (2\cos(\theta) + 1) = 0$

$\Rightarrow -\cos(\theta) = 0$

⊗ Isolate:

$\Rightarrow \frac{-\cos(\theta)}{-1} = \frac{0}{-1}$

$\Rightarrow \cos(\theta) = 0$

⊗ Quadrantal

$\Rightarrow \boxed{\theta = 0}$

or $2\cos(\theta) + 1 = 0$

⊗ Isolate:

$2\cos(\theta) = -1$

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

⊗ Quadrant Check

QII QIII

⊗ Reference x:
Special Angle

$\theta_R = \pi/3$

QII $\theta = \pi - \pi/3$

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

QIII

$\theta = \pi + \pi/3$

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