Solutions

① $2\cos(x)+8=7$ in $[0, 2\pi)$

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

⊛ Quad check:
QII QIII

⊛ Ref ∠: $x_R = \pi/3$

⊛ solve
$x = 2\pi/3 \quad x = 4\pi/3$

② $\tan(x)+1=0$ in $(-\infty, \infty)$

⊛ Isolate:
$\Rightarrow \tan(x) = -1$

⊛ Quad check:
QII QIV

⊛ Ref ∠: Note: we want $\tan(x) = 1 \Rightarrow$ that is $\Rightarrow \frac{\sin(x)}{\cos(x)} = 1$

$\Rightarrow$ The only way a fraction can equal zero is if numerator and denominator are equal:
$\Rightarrow$ the Ref ∠ with $\sin(x) = \cos(x)$, that is, y-coord = x-coord. is

$x_R = \pi/4$ ⊛ solve
$x = 3\pi/4 \quad x = 7\pi/4$

$x = \frac{3\pi}{4} \pm 2\pi k$
$x = \frac{7\pi}{4} \pm 2\pi k$

#3. $4\sin^2(x)+2=5$ in $[0, 2\pi)$

⊛ Isolate
$\Rightarrow 4\sin^2(x) = 3$
$\Rightarrow \sin^2(x) = \frac{3}{4}$
$\Rightarrow \sin(x) = \pm\sqrt{\frac{3}{4}}$
$\Rightarrow \sin(x) = \pm\frac{\sqrt{3}}{2}$

⊛ Quad. check
all 4 Quads.

⊛ Ref. ∠
$x_R = \pi/3$

⊛ solve
$x = \pi/3$
$x = 2\pi/3$
$x = 4\pi/3$
$x = 5\pi/3$

#4 $(\cos(x)+1)(\tan(x)-1)=0$ on $[0,2\pi)$ pg 2 of 2

⇒ NOTE: set each factor equal to ZERO:

$\cos(x)+1=0$ or $\tan(x)-1=0$

⇒ $\cos(x)+1=0$

⊛ SOLVE each individually

⊛ $\cos(x)+1=0$

⊛ ISOLATE:

$\cos(x)=-1$

Quadrantal!

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

⊛ $\tan(x)-1=0$

⊛ Isolate

$\tan(x)=1$

⊛ Quadt. Check:

QI QIII

⊛ Ref $\measuredangle$:

$x_R=\pi/4$

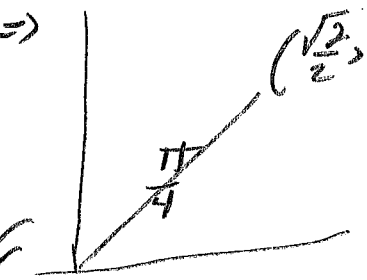
NOTE: TO solve $\tan(x)=1$ we want $\frac{\sin(x)}{\cos(x)}=1$ that is we want

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

that is

y-coord = x-coord

⇒



thus $x_R=\pi/4$

etc

⊛ solve

$x=\frac{\pi}{4}$

$x=\frac{5\pi}{4}$

so

$x=\pi$

$x=\pi/4$

$x=5\pi/4$

#5 $5\tan(x)+1.6=-11.4$ in $[0,2\pi)$

⊛ Isolate:

$\Rightarrow 5\tan(x)=-13$

$\Rightarrow \tan(x)=-\frac{13}{5}$

⊛ Quad check

QII QIII

⊛ Ref $\measuredangle$ (calculator!)

$x_R=\tan^{-1}\left(\frac{13}{5}\right)$

≈ 1.20

⊛ Solve

QII: $x=\pi-1.20$ ≈ 1.94

QIII: $x=2\pi-1.20$ ≈ 5.08

#6 $3\sec(x)+10=4$ in $[0,2\pi)$

⊛ Isolate:

$\Rightarrow 3\sec(x)=-6$

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

RECIPROCAL!

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

⊛ Quad. check:

QII QIII

⊛ Ref $\measuredangle$:

$x_R=\pi/3$

⊛ solve:

$x=2\pi/3$

$x=4\pi/3$

#7 $\sin(x)=0$ in $(-\infty,\infty)$

⊛ Quadrantal

$\Rightarrow x=0$

$x=\pi$

$\Rightarrow$ so $x=0\pm 2\pi k$

$x=\pi\pm 2\pi k$

#8 $2\sin(x)\tan(x)+\tan(x)=0$ in $[0,2\pi)$

First FACTOR OUT $\tan(x)$

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

* set each equal to zero and solve separately

$\tan(x)=0$ (Quadrantal)

$x=0$

$x=\pi$

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

* Isolate

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

* Quad. check

QIII QIV

* Ref x:

$x_r=\pi/6$

* Solve

$x=\frac{7\pi}{6}$ $x=\frac{11\pi}{6}$

So we have:

$x=0\pm 2\pi k$

$x=\pi\pm 2\pi k$

$x=\frac{7\pi}{6}\pm 2\pi k$

$x=\frac{11\pi}{6}\pm 2\pi k$

Oops! Didn't need this!

The solutions ARE

$x=0,\ x=\pi,\ x=\frac{7\pi}{6},\ x=\frac{11\pi}{6}$

#9 $4.3\sin(x)+2.1=3.9$ in $(-\pi,\pi]$

* Isolate

$\Rightarrow 4.3\sin(x)=1.8$

$\Rightarrow \sin(x)=\frac{1.8}{4.3}$

* Quad. check

QI QII

* Ref. x:

$x_r=\sin^{-1}\left(\frac{1.8}{4.3}\right)$

$=.43$

* Solve:

QI $x=.43$

QII $x=\pi-.43$

$=2.71$

So

$x=.43\pm 2\pi k$

$x=2.71\pm 2\pi k$

#10 ↙ sorry for the numbering issues these came from two different sources. pg 5 ive

#1 $2\cos(x)+8=7$ in $(-\infty,\infty)$

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

* Quad check
QII QIII

* Ref ∠:
$x_R=\pi/3$

* solve:
QII $x=\frac{2\pi}{3}$
QIII $x=\frac{4\pi}{3}$

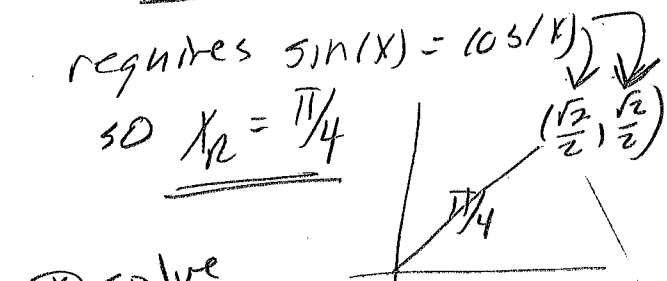
so we have
$$x=\frac{2\pi}{3}\pm 2\pi k$$
$$x=\frac{4\pi}{3}\pm 2\pi k$$

#2 $\tan(x)+1=0$ in $[0,2\pi)$

* Isolate:
$\Rightarrow \tan(x)=-1$

* Quad check
QII QIII

* Ref ∠. Again, this requires $\sin(x)=\cos(x)$
so $x_R=\pi/4$



* solve
$$x=\frac{3\pi}{4} \quad x=\frac{7\pi}{4}$$

#3 $3\sec(x)+10=4$ in $[0,2\pi)$

NOTE: This is the same as #6 so let's change the problem to:

$3\sec(x)+11=4$

* Isolate
$\sec(x)=\frac{-7}{3}$

* Reciprocal
$\cos(x)=-\frac{3}{7}$

* Quad. check
QII QIII

* Ref ∠: use calculator!
$x_R=\cos^{-1}(\frac{3}{7})$
$x_R=1.13$

* solve:
QII: $x=\pi-1.13 \Rightarrow x=2.01$
QIII: $x=\pi+1.13 \Rightarrow x=4.27$

Pg 61x

#4 $\sin(x) = 0$ in $(-\infty, \infty)$

$x = 0$, $x = \pi$ $\Rightarrow$ so $x = 0 \pm 2\pi k$, $x = \pi \pm 2\pi k$

#5 $2\sin(x)\cos(x) + \cos(x) = 0$ in $[0, 2\pi)$

* FACTOR OUT $\cos(x)$

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

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

Quadrantal

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

* ISOLATE: $\sin(x) = -\frac{1}{2}$

* Quad. check: QIII, QIV

* Ref $\measuredangle$: $x_R = \pi/6$ $\Rightarrow$ $x = \frac{7\pi}{6}$, $x = \frac{11\pi}{6}$

$\Rightarrow$ so we have $x = \pi/2$, $x = 3\pi/2$, $x = 7\pi/6$, $x = 11\pi/6$

#6 * sorry. Another repeated item. in $(-\infty, \infty)$

solve this instead: $2.7\csc(x) - 5.4 = 3.6$

* $2.7\csc(x) - 5.4 = 3.6$

* Isolate

$\Rightarrow 2.7\csc(x) = 9$

$\Rightarrow \csc(x) = \frac{9}{2.7}$

* Reciprocal

$\sin(x) = \frac{2.7}{9}$

* Quad. check: QI, QII

* Ref $\measuredangle$: $x_R = \sin^{-1}\left(\frac{2.7}{9}\right) = .30$

* solve

QI $x = .30$

QII $x = \pi - .30 = 2.84$

so $x = .30 \pm 2\pi k$, $x = 2.84 \pm 2\pi k$