5. Solve each of the following equations.

a) $\sin\left(\frac{\pi}{4}(x-6)\right) = 0.5,\ 0 \le x \le 2\pi$

b) $4\cos(x-45°) + 7 = 10,\ 0° \le x \le 360°$

c) $8\cos(2x-5) = 3$, general solution in radians

d) $5.2\sin(45(x+8°)) - 1 = -3$, general solution in degrees

$m = \begin{cases} 202.62 \\ 337.38° \end{cases} + 360°\, n, n \in I$

let $m = 45(x+8°)$

$5.2\sin m - 1 = -3$

$\sin m = \frac{-2}{5.2}$

$m = \sin^{-1}\left(\frac{-2}{5.2}\right)$

$m = -22.619°$ QIV

find the smallest positive coterminal angle

$m = -22.619° + 360°$

$= 337.38°$

not a unit circle value

QIII + IV

QIII: $180° + 22.619°$

202.62

$$m = \begin{cases} 202.62^\circ \\ 337.38^\circ \end{cases} + 360^\circ n, n \in I$$

$$45(x+8^\circ) = \begin{cases} 202.62^\circ \\ 337.38^\circ \end{cases} + 360^\circ n$$

$$x + 8^\circ = \begin{cases} 4.50^\circ \\ 7.50^\circ \end{cases} + 8^\circ n$$

$$X = \begin{cases} -3.50^\circ \\ -0.50^\circ \end{cases} + 8^\circ n, n \in I$$

Ch 5-4 Solving Trig equations Day # 3

Solve The following for the given interval:

A) $2\csc^2\theta - 8 = 0$ $\quad \theta \in R$ (radians)

let $m = \csc\theta$

$2m^2 - 8 = 0$

$2(m^2 - 4) = 0$

$\frac{2(m+2)(m-2)}{2} = \frac{0}{2}$

$(m+2)(m-2) = 0$

$m = -2 \quad m = 2$

$\csc\theta = -2 \quad \csc\theta = 2$

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

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

$\theta = \begin{cases} \frac{7\pi}{6} \\ \frac{11\pi}{6} \end{cases} + 2\pi k, k \in I$

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

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

$\theta = \begin{cases} \frac{\pi}{6} \\ \frac{5\pi}{6} \end{cases} + 2\pi k, k \in I$

Ch 5-4 Solving Trig equations Day # 3

Solve The following for the given interval:

A) $2\csc^2\theta - 8 = 0$ $\quad\theta \in R$ (radians)

$$\frac{2\csc^2\theta}{2} = \frac{8}{2}$$

$$\csc^2\theta = 4$$

$$\sqrt{\csc^2\theta} = \sqrt{4}$$

$$\csc\theta = \pm 2$$

$\csc\theta = 2$

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

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

$$\theta = \begin{cases} \frac{\pi}{6} \\ \frac{5\pi}{6} \end{cases} + 2\pi n, n \in I$$

$\csc\theta = -2$

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

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

$$\theta = \begin{cases} \frac{7\pi}{6} \\ \frac{11\pi}{6} \end{cases} + 2\pi n, n \in I$$

B) $2\sec^2\theta = 1 - \sec\theta \qquad \theta \in R \qquad$ (radians)

let $a = \sec\theta$

$2a^2 = 1 - a$

$2a^2 + a - 1 = 0$

$(2a - 1)(a + 1) = 0$

$a = \frac{1}{2} \qquad a = -1$

$\sec\theta = \frac{1}{2} \qquad \sec\theta = -1$

$\sec\theta = -1$

$\frac{1}{\cos\theta} = -1$

$\cos\theta = -1$

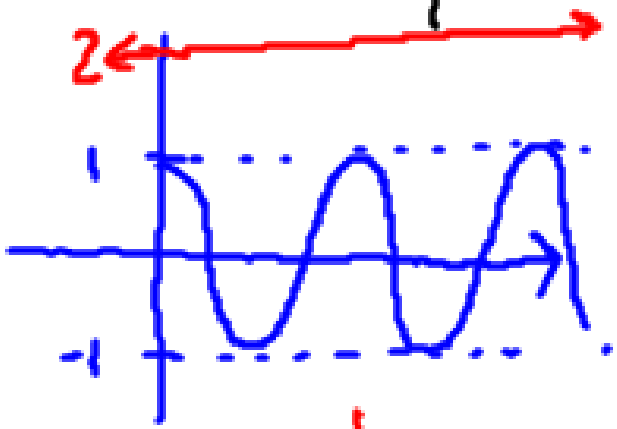
$\theta = -\pi + 2\pi n, n \in I$

No points of intersection

$\sec\theta = \frac{1}{2}$

$\frac{1}{\cos\theta} = \frac{1}{2}$

$\cos\theta = \frac{2}{1}$



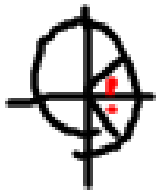
$\cos\theta = 2$ has no Sol'n

C) $\cos(2x) = 0.8179$ $\quad 0° < x < 360°$

let $a = 2x$

$\cos a = 0.8179$

QI & QIV



$a = \cos^{-1}(0.8179)$

$a = \begin{cases} 35.12° \text{ QI} \\ 360° - 35.12° \text{ (QIV)} \end{cases}$

$2x = \begin{cases} 35.12° \\ 324.88° \end{cases} + 360°k, k \in I$

$x = \begin{cases} 17.56° \\ 162.44° \end{cases} + 180°k, k \in I$

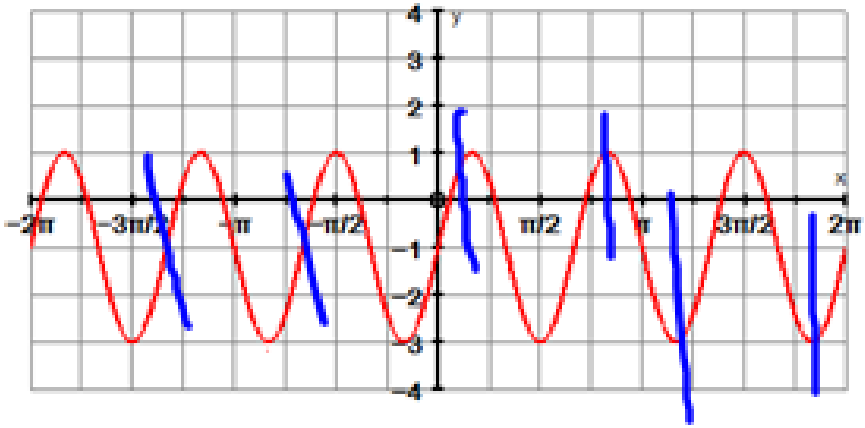
Interval:

$x = \begin{cases} 17.56°, 197.56° \\ 162.44°, 342.44° \end{cases}$

Zeros of Trig functions

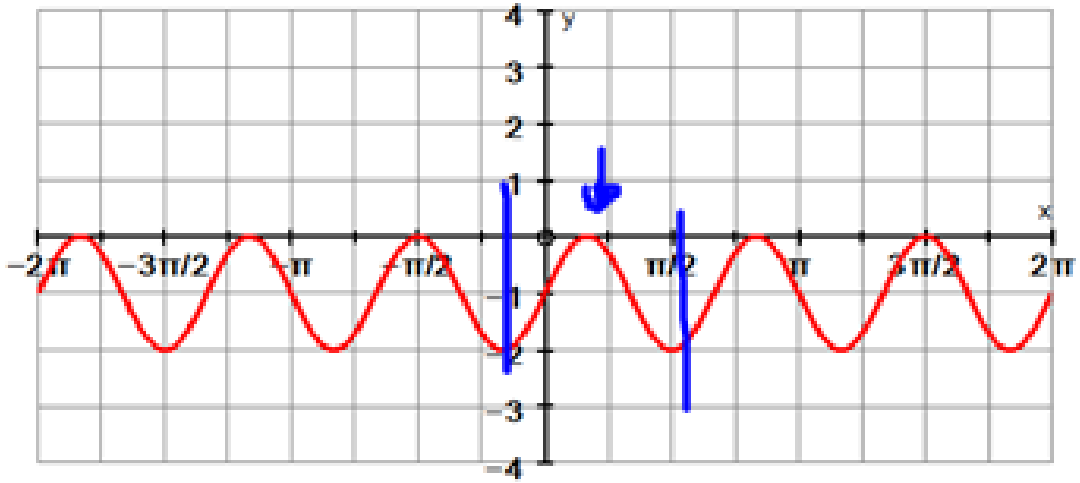
A) 2 x-intercepts per period

$f(x) = 2\sin(3x) - 1$



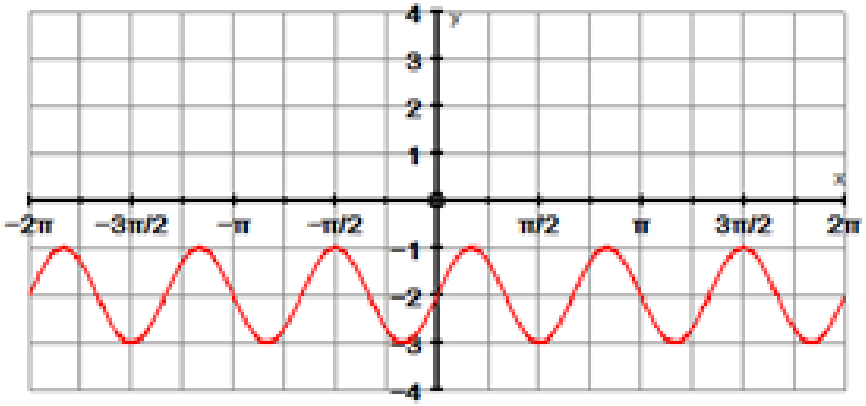
B) 1 x-intercept per period

$f(x) = \sin(3x) - 1$



C) NO x-intercepts per period

$f(x) = \sin(3x) - 2$



$\sin^4 x = y$