$y = -2 + 3\cos\left[\frac{2\pi}{3}x\right]$ Find the first three (+) values of x for which $y = 1$

$1 = -2 + 3\cos\left(\frac{2\pi}{3}x\right)$

period $= \frac{2\pi}{(2\pi/3)} = 2\pi \cdot \frac{3}{2\pi} = 3$

$3 = 3\cos\left(\frac{2\pi}{3}x\right)$

Remember that these functions are periodic and that isolating for x will yield multiple answers.

REMEMBER:

$$\cos^{-1}\frac{x}{r} = \left\{\begin{matrix} \text{calculator } \pm 2\pi n \\ -\text{calculator } \pm 2\pi n \end{matrix}\right\} \qquad \sin^{-1}\frac{y}{r} = \left\{\begin{matrix} \text{calculator } \pm 2\pi n \\ \pi - \text{calculator } \pm 2\pi n \end{matrix}\right\}$$

$1 = \cos\left(\frac{2\pi}{3}x\right)$

$\cos^{-1}(1) = \frac{2\pi}{3}x$

So if, for example, $x = \left\{\begin{matrix} 1 \pm 6n \\ -3 \pm 6n \end{matrix}\right\}$, this means there is an infinite number of answers, namely

$$x = \left\{\begin{matrix} \ldots -11,\ -5,\ 1,\ 7,\ 13,\ \ldots \\ \ldots -15,\ -9,\ -3,\ 9,\ 15,\ \ldots \end{matrix}\right\}$$

$0 \pm 2\pi n = \frac{2\pi}{3}x$

It is likely specific solutions will be solicited.

$x = (0 \pm 2\pi n)\frac{3}{2\pi}$

$x = 0 \pm 3n$ $\quad x = 0, 3, 6, 9, 12$

$y = 2 + 5\sin\left[\frac{\pi}{7}(x+1)\right]$

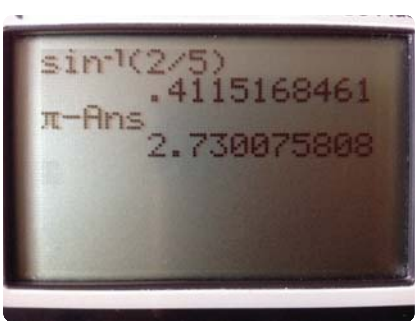
$y = 4$

$4 = 2 + 5\sin\left[\frac{\pi}{7}(x+1)\right]$

$\frac{2}{5} = \sin\left[\frac{\pi}{7}(x+1)\right]$

$\sin^{-1}\left(\frac{2}{5}\right) = \frac{\pi}{7}(x+1)$

$\frac{7}{\pi}\sin^{-1}\left(\frac{2}{5}\right) = x+1$



$\frac{7}{\pi}\sin^{-1}\left(\frac{2}{5}\right) - 1 = x$

$\frac{7}{\pi}\left\{\begin{matrix} 0.412 \pm 2\pi n \\ \pi - 0.412 \pm 2\pi n \end{matrix}\right\} - 1 = x$

just remember that this will always be the period of the function

$$\left.\begin{matrix} (0.917 \pm 14n) - 1 \\ (6.083 \pm 14n) - 1 \end{matrix}\right\} = x$$

$$\left.\begin{array}{l}(-0.083 \pm 14n)\\[1em](5.083 \pm 14n)\end{array}\right\} = X$$

+14 +14

$$X = -0.083,\ 5.083,\ 13.917,\ 19.083,\ 27.917,\ 33.083,\ 41.917 \ldots$$

+14 +14