Determine where the function below is DECREASING,

$f(x) = 2\cos\frac{\pi}{2}(x+3)+1$

a) over $[h, h+p]$ $[-3, 1]$

b) over $\mathbb{R}$

$a = 2$

$max = 1+2 = 3$

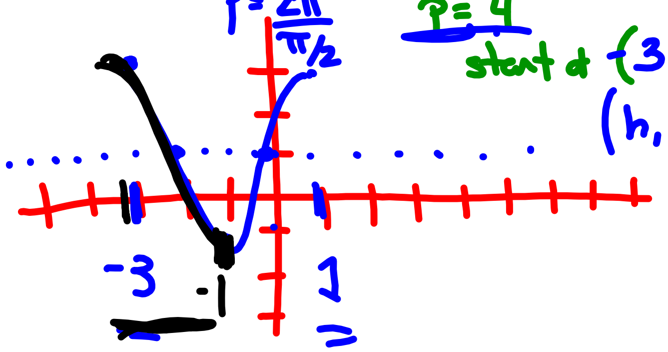
$min = 1-2 = -1$

$P = \frac{2\pi}{\pi/2}$

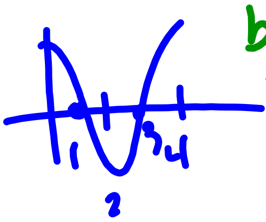
$P = 4$

start at $(-3, 3)$

$(h, \text{max/min})$



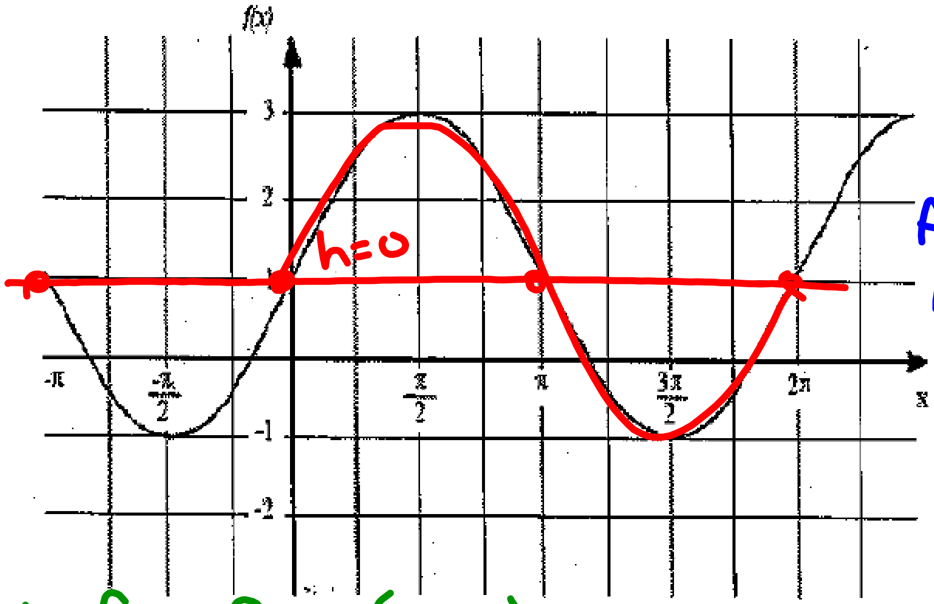
a) $[-3, -1]$



b) $[-3+4n, -1+4n]$

$n \in \mathbb{Z}$

Given the function shown here, determine the **rule** as a



a) cosine function

b) sine function

$A = \frac{3-(-1)}{2} \Rightarrow a = \pm 2$

$A = 4/2 = 2$

$K = 3 - 2 = 1$

$P = 2\pi \Rightarrow b = \pm\frac{2\pi}{2\pi} = \pm 1$

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

b) $f(x) = 2\sin(x) + 1$

The depth of water at the port of St. Marie-Elise varies according to the tides. A sinusoidal function can be used to predict water depth. At low tide, the depth of the water is 9.2 m. At high tide, it is 18.2 m. The time between two low tides is 12 hours and 30 minutes.

In order for an oil tanker to dock safely, the depth of water must be at least 14.5 m.

For how many hours can an oil tanker dock safely between two consecutive low tides?

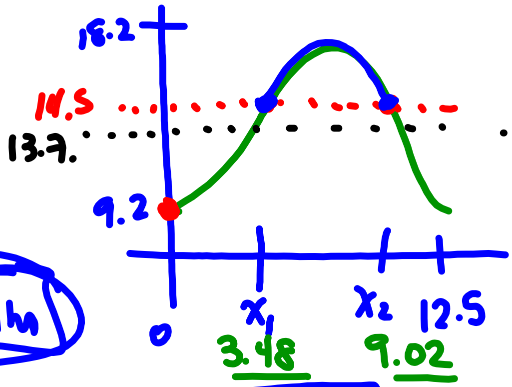
$A = \frac{18.2-9.2}{2} = \frac{9}{2} = 4.5$

$a = \boxed{\pm}4.5$

$P = 12.5\,h \Rightarrow b = \pm\frac{2\pi}{12.5}$ or $\frac{4\pi}{25}$

$k = 18.2 - 4.5 = 13.7$

5.54h



$y = -4.5\cos\left(\frac{4\pi}{25}x\right) + 13.7$

let $\boxed{y = 14.5}$

$14.5 = -4.5\cos\left(\frac{4\pi}{25}x\right) + 13.7$

$0.8 = -4.5\cos\left(\frac{4\pi}{25}x\right)$

$-0.1\overline{7} = \cos\left(\frac{4\pi}{25}x\right)$

$\cos^{-1}(-0.1\overline{7}) = \frac{4\pi}{25}x$

$1.7495 = \frac{4\pi}{25}x$

$3.48 = x$

OR $2\pi - 1.7495 = \frac{4\pi}{25}x$

$9.02 = \quad 4.5337 = \frac{4\pi}{25}x$

For the given **TANGENT function**: $f(x) = 2tan\frac{\pi}{4}(x-1)+2$, determine:

$P = \pi \div \frac{\pi}{4} = 4$

a) the equations of 2 consecutive asymptotes

$1 \pm \frac{4}{2}$ $h \pm \frac{P}{2} = x$

$\rightarrow x = -1$ $x = 3$

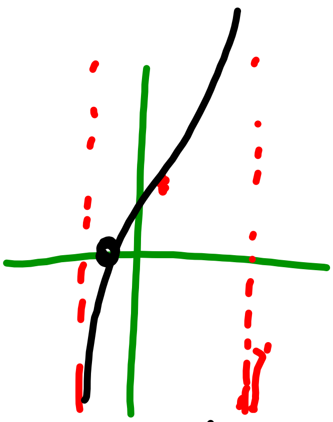
b) the domain

$\frac{\sin}{\cos} \Rightarrow y$

$\mathbb{R} \setminus 3 + 4n$

$n \in \mathbb{Z}$

c) the zeros over $\mathbb{R}$



$0 = 2\tan\frac{\pi}{4}(x-1)+2$

$-1 = \tan\frac{\pi}{4}(x-1)$

$\frac{3\cancel{\pi}}{\cancel{4}} = \frac{\cancel{\pi}}{\cancel{4}}(x-1)$

$4 = x$

$4 + 4n, n \in \mathbb{Z}$