Key

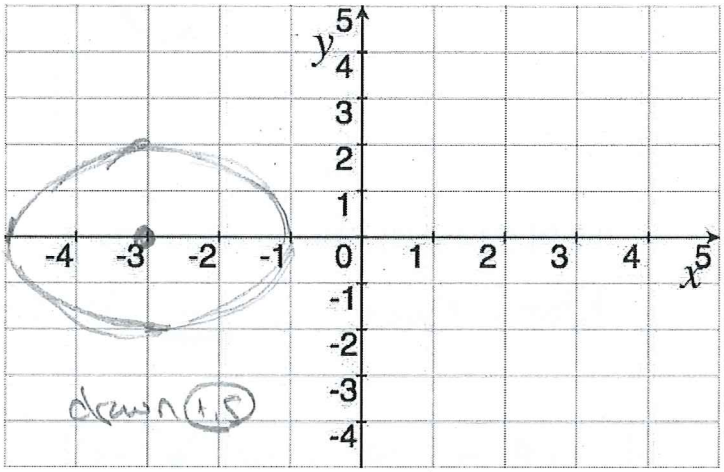
Quiz 4

Show *all* your work. No credit is given without reasonable supporting work. There are *two* sides to this quiz.

1. [3] (WebHW10 #11)
Draw the circle defined by:
$x^2 + 6x + y^2 = -5$

$x^2+6x+y^2=-5$
$+\left(\frac{6}{2}\right)^2 \quad +3^2$

$x^2+6x+9+y^2=4$
$(x+3)^2+y^2=4$
$\Rightarrow$ center @ $(-3,0)$ (+1.5)
$\Rightarrow$ radius is $\sqrt{4}=2$ (+1)



note: scale is not square so circle looks funky

2. [2] (WebHW11 #22) Given that $\cos(x) = \frac{60}{61}$ and $-90° < x < 0°$, find the exact value of $\sin(x)$ (that means I'm expecting a fraction!).

(+1.5) $(\cos x)^2+(\sin x)^2=1$ Pythagoras?

(.5) $\left(\frac{60}{61}\right)^2+(\sin x)^2=1$

$(\sin(x))^2 = 1-\left(\frac{60}{61}\right)^2$

$\sin(x) = \pm\sqrt{\frac{61^2-60^2}{61^2}}$

(+1.5) alg $\sin(x) = \pm\sqrt{\frac{121}{61^2}}$

$\sin(x) = \pm 11/61$

(+.5) [b/c $-90° < x < 0°$; $\sin(x)$ is negative] $\Rightarrow$ so $\sin(x) = -11/61$

(new material)

$x = \arccos\left(\frac{60}{61}\right)$

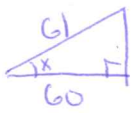
then

or $\sin(x) = \sin\left(\arccos\left(\frac{60}{61}\right)\right)$

note calculators may give you an exact answer... if not using Pythagoras again

or

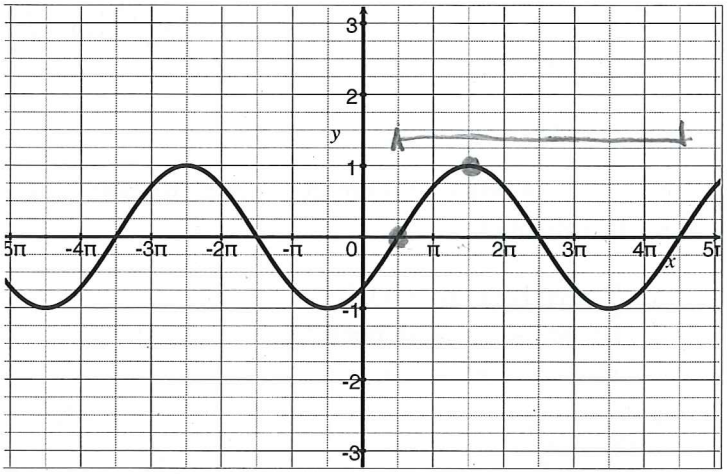
$\cos(x) = \frac{60}{61} = \frac{\text{adj}}{\text{hyp}}$



$\sin x = \frac{\text{opp}}{\text{hyp}}$

$60^2+\text{opp}^2=61^2 \Rightarrow \text{opp}=11$

3. Consider the graph of f:



(a) [1] (trigTransform #5) Find the period of f.

4π

(b) [4] (§4.4 #82) Write an equation for f.

Note: there are lots of correct answers!

(+1) If sine function: $\sin(b(x+c))$

(+1) [phase shift of $\pi/2$ $\Rightarrow$ $c = -\pi/2$

(+1) [period is $4\pi = \frac{2\pi}{b}$ $\Rightarrow$ $b = 1/2$

So

$\sin(\frac{1}{2}(x - \pi/2))$

or

$\sin(\frac{1}{2}x - \pi/4)$

Plug in (+.5)

Order of op +.5

or

If cosine function: $\cos(b(x+c))$

phase shift of $3\pi/2$ $\Rightarrow$ $c = -3\pi/2$

period: $4\pi = \frac{2\pi}{b}$ $\Rightarrow$ $b = 1/2$

So

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

or

$\cos(\frac{1}{2}x - 3\pi/4)$

—— or ——

If $-\sin(b(x+c))$

phase shift of $-3\pi/2$ $\Rightarrow$ $c = 3\pi/2$

period: $4\pi = \frac{2\pi}{b}$ $\Rightarrow$ $b = 1/2$

So

$-\sin(\frac{1}{2}(x + 3\pi/2))$

or

$-\sin(\frac{1}{2}x + 3\pi/4)$