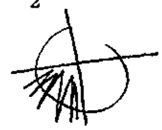
Quiz 3

Key

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

1. (§4.3 #52 or HW13 #23) Let $\pi < \theta < \frac{3\pi}{2}$ and $\cos\theta = \frac{-8}{17}$.

   (a) [1] Which quadrant is θ in?

   III

   (b) [3] Find $\sin\theta$ *exactly*.
   (Decimal approximations are not sufficient although worth partial credit!)

Recall Pythagorus $\left.\begin{array}{l}\\ \sin^2\theta + \cos^2\theta = 1\end{array}\right\}$ (+.5)

$(\sin\theta)^2 + \left(\frac{-8}{17}\right)^2 = 1$ } (+.5)

notation (+.5)

$(\sin\theta)^2 = 1 - \frac{64}{17^2}$

alg (+.5)

$\sin\theta = \pm\sqrt{\frac{289-64}{17^2}}$

$\sin\theta = \pm\sqrt{\frac{225}{17^2}}$

$\sin\theta = \pm\sqrt{\frac{15^2}{17^2}}$

$\sin\theta = \pm\frac{15}{17}$ } (+.5)

17×17: 119, 170, 289

$289 - 64 = 225$

15×15: 75, 150, 225

(+.5) b/c θ is in quad III $\sin\theta < 0$

so $\sin\theta = -15/17$

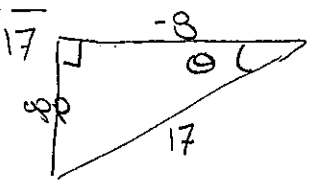
or

Recall Sohcahtoa } (+.5)

(+.5) $\cos\theta = \frac{adj}{hyp} = \frac{-8}{17}$

we want

$\sin\theta = \frac{opp}{hyp}$



(+.5)

find opp:

$opp^2 + (-8)^2 = 17^2$

$opp^2 + 64 = 289$

$opp^2 = 225$

$opp = 15$

} alg (+.5)

so

$\sin\theta = 15/17$ } (+.5)

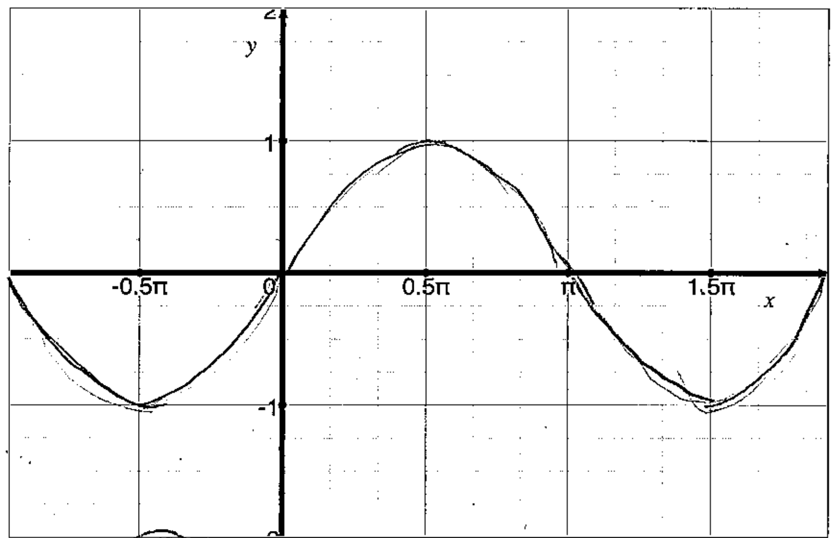
(+.5) b/c θ is in quad III $\sin\theta$ <

so

$\sin\theta = -15/17$

2. Let $f(x) = \sin(x)$.

(a) [1] Graph of f.



(b) [1] What is the range of f?

$[-1,1]$ } (+.5)

y values (+.5)

(c) [1] Does f have an inverse? Why or why not?

no? (+.5) b/c fails horizontal line test (+.5)

(d) [1] (WebHW12 #5) Let $g(x) = f(2(x + \frac{\pi}{2}))$. Find the period of g.

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

(e) [2] (TrigGraphWks pg 4) Sketch the graph of $g(x)$

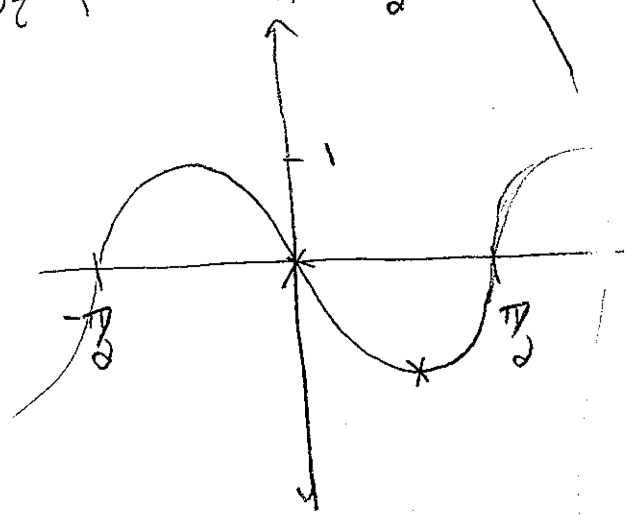
period $= \pi$

(+.5) { phase shift $= \pi/2$

~~Plotting points~~

note

$g(0) = f(2(0 + \pi/2))$
$= f(2 \cdot \pi/2)$
$= f(\pi)$
$= \sin \pi = 0$



$g(\pi/4) = f(2(\pi/4 + \pi/2))$
$= f(2 \cdot 3\pi/4)$
$= f(\frac{3\pi}{2})$
$= \sin 3\pi/2$
$= -1$

Shape (+.5)

got it (+1)