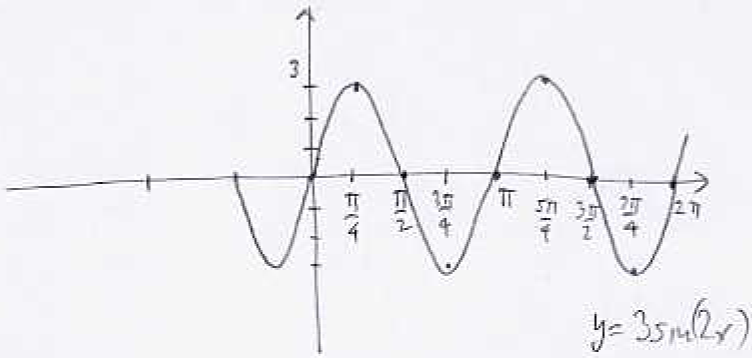
Spring '06/MAT 145/Worksheet 3 **Name:** Solution *Show all your work.*

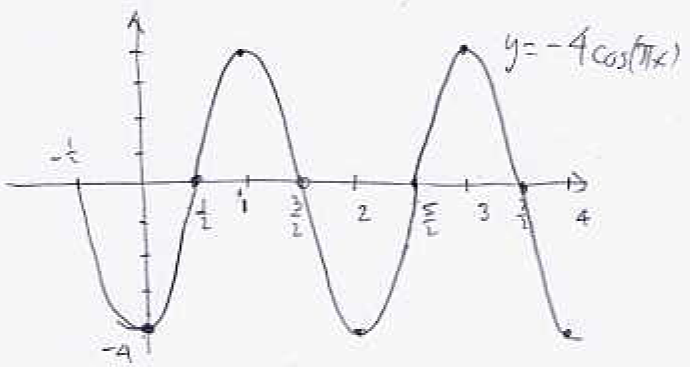
1. (5pts) Draw two periods of the graph of $y = 3\sin(2x)$. What is the amplitude? The period? Indicate where the special points are (x-intercepts, peaks, valleys).



$A = 3$

$P = 2\pi \cdot \frac{1}{2} = \pi$

2. (5pts) Draw two periods of the graph of $y = -4\cos(\pi x)$. What is the amplitude? The period? Indicate where the special points are (x-intercepts, peaks, valleys).

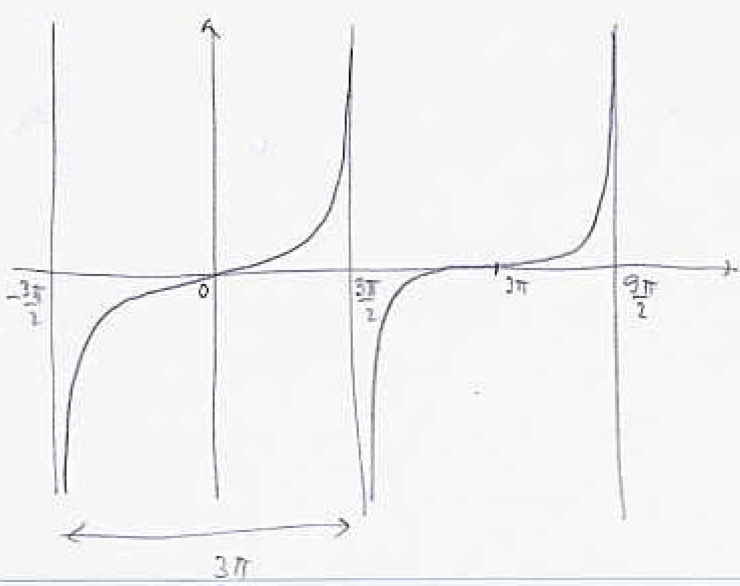


$A = 4$

$P = 2\pi \cdot \frac{1}{\pi} = 2$

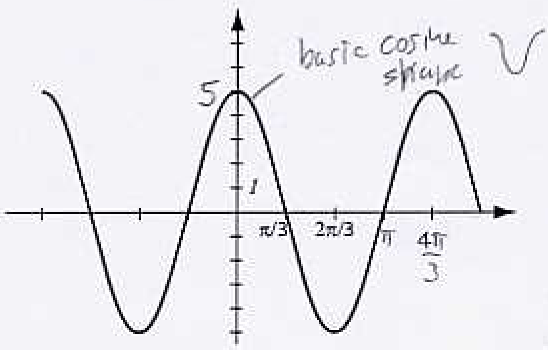
(Because of the $-$, graph is the reflection in the x-axis of the basic cosine shape $\vee$)

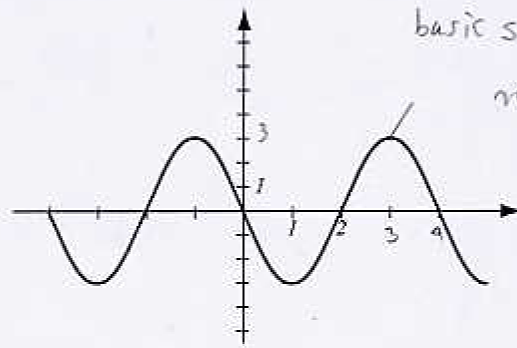
3. (5pts) Draw two periods of the graph of $y = \tan\left(\frac{1}{3}x\right)$. What is the period? Indicate where the special points are (x-intercepts, asymptotes).



$P = \pi \cdot \frac{1}{\frac{1}{3}} = 3\pi$

4. (8pts) For each of the following two graphs, do the following:
a) Find the amplitude.
b) Find the period.
c) Use this information to help you find the equation for each graph.





basic sine shape, reflected in x-axis

$A = 5$

$P = \frac{4\pi}{3}$

$\frac{2\pi}{\omega} = \frac{4\pi}{3}$

$3 \cdot 2\pi = 4\pi \cdot \omega$

$\omega = \frac{3 \cdot \cancel{6\pi}}{2 \cdot \cancel{4\pi}} = \frac{3}{2}$

$y = 5\cos\left(\frac{3}{2}x\right)$

$A = 3$

$P = 4$

$\frac{2\pi}{\omega} = 4$

$2\pi = 4\omega$

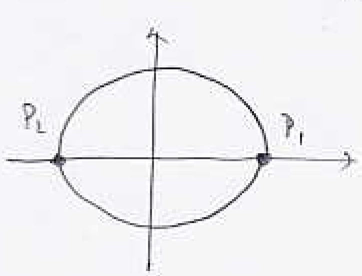
$\omega = \frac{2\pi}{4} = \frac{\pi}{2}$

$y = -3\sin\left(\frac{\pi}{2}x\right)$

5. (7pts) a) Use the unit circle to find all the angles where $\csc\theta$ is not defined.
b) What is the period of $\csc\theta$?
c) Use your calculator to help you sketch two periods of the graph of $y = \csc\theta$. Indicate where the special points are (x-intercepts, peaks, valleys, asymptotes).

a) $\csc\theta = \frac{1}{\sin\theta} = \frac{1}{y}$ on unit circle

Not defined when $y = 0$



P_1 corresponds to: $0, 2\pi, 4\pi$ etc. $\theta = 0 + k \cdot 2\pi$

P_2 — — : $\pi, 3\pi, 5\pi$ etc. $\theta = \pi + k \cdot 2\pi$

b) Period of $\csc\theta$ is the same as period of $\sin\theta$, which is 2π