Math 113 Second Exam
Version A

June 4, 2004
11:30am - 12:20pm
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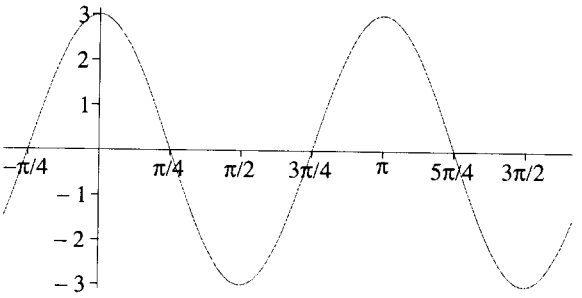
NAME:

Keep exact values whenever possible.
Full credit can only be given to justified answers.

1. (30 points) Below is the graph of the function $y = A\sin(Bx + C)$. Find the values of A, B and C.



2. (35 points) For an angle Θ, we know that $\cos\Theta = \frac{1}{4}$ and that $\frac{3}{2}\pi \leq \Theta \leq 2\pi$. Find the **exact** values of $\sin\Theta$, $\tan\Theta$, $\cot\Theta$.

3. (20 points) Determine the **exact** value of

$$\cos\left(\mathrm{Cos}^{-1}\frac{1}{4}\right),\ \sin\left(\mathrm{Cos}^{-1}\frac{1}{4}\right),\ \tan\left(\mathrm{Cos}^{-1}\frac{1}{4}\right),\ \cot\left(\mathrm{Cos}^{-1}\frac{1}{4}\right).$$

4. It can be shown that

$$\sin(22.5^\circ) = \frac{\sqrt{2-\sqrt{2}}}{2}.$$

(a) (10 points) Use this to find the **exact** value of $\cos(22.5^\circ)$.

(b) (10 points) Verify that the sum identities for $\sin(45^\circ) = \sin(22.5^\circ + 22.5^\circ)$ and $\cos(45^\circ) = \cos(22.5^\circ + 22.5^\circ)$ give **exactly** the correct answer.

(c) (15 points) Use the exact values of sine and cosine at 22.5° and 60° to compute the **exact** values of $\sin(37.5^\circ)$, $\cos(37.5^\circ)$, $\tan(37.5^\circ)$, $\cot(37.5^\circ)$. Verify your answer with your calculator.