SAMPLE MIDTERM 2
MAT 123 Spring 2003
Midterm 1 is 8:30-10:00pm, Wednesday, 4/9/03
Exam locations given in table on right

room	sections
Javits 100	R2,R8,R9,R10,R12,R13, ELC04
Light Eng 102	R11
ESS 001	R5,R7, ELC03
Javits 109	R1,R4
Lib W0512	R3,R6

1. Place the letter corresponding to the correct answer in the box next to each question.

   (i) ☐ Which of the following numbers is largest? **(a)** 2^{20} **(b)** 3^{10} **(c)** 4^{10} **(d)** 8^7 **(e)** 16^5 **(f)** 9^5

   (ii) ☐ Simplify $\log_2(8x4^x)$ **(a)** $2x\log_2(4x)$ **(b)** $3+\log_2 x+2x$ **(c)** $4\log_2 x+x$ **(d)** $2x+2\log_2 x$ **(e)** $\log_2(4)+(2+x)\log_2(2x)$ **(f)** none of these.

   (iii) ☐ The number $\log_2 3$ is also equal to **(a)** $\log_{10}2/\log_{10}3$ **(b)** $log_{10}3/\log_2 3$ **(c)** $\ln 3$ **(d)** $\ln 3/\ln 2$ **(e)** $\ln 2/\ln 3$ **(f)** none of these.

   (iv) ☐ Solve $7^{x+2}=3$ for x. **(a)** $x=(\ln 7/\ln 3)-2$ **(b)** $x=(\ln 3/\ln 7)-2$ **(c)** $x=(\ln 2/\ln 7)-3$ **(d)** $x=(\ln 7/\ln 3)+2$ **(e)** $x=(\ln 7/\ln 2)+3$ **(f)** none of these.

   (v) ☐ Suppose $\sin(t)=.6$. Then $|\cos(t)|=$ **(a)** .5 **(b)** .6 **(c)** .7 **(d)** .8 **(e)** .9 **(f)** none of these.

2. Identify each of the following functions as even (E), odd (O) or neither (N):

   ☐ $\sin(x)$ ☐ $x^3\sin(x)$ ☐ e^x ☐ $\sin^2(x)$ ☐ $\sin(x)+\cos(x)$

3. Compute the following:

   (i) $\sin(\pi/4)$
   (ii) $\tan(\pi/6)$
   (iii) $\sec(7\pi/6)$
   (iv) $\cos(-2\pi/3)$

4. Each of the following functions is graphed in the figure on the interval $0 \le x \le 2\pi$. Place the letter of the correct graph in the box next to the corresponding formula.

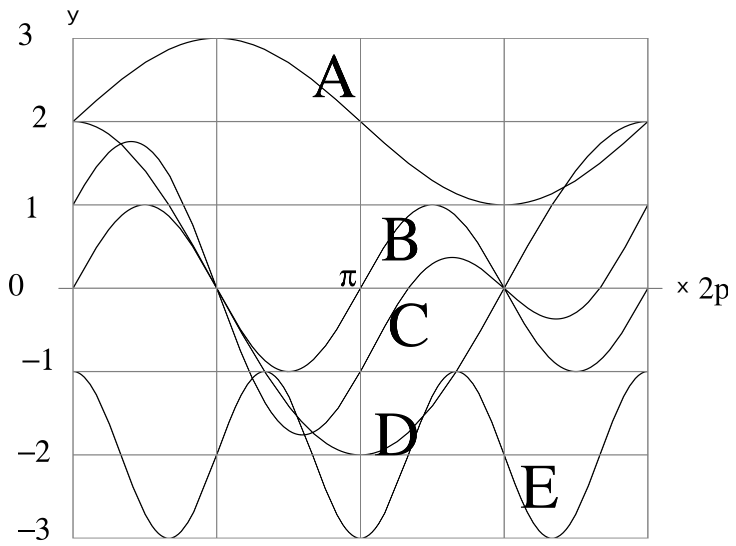
(i) $\square$ $2\cos(x)$

(ii) $\square$ $\sin(2x)$

(iii) $\square$ $2 + \sin(x)$

(iv) $\square$ $\cos(x) + \sin(x)$

(v) $\square$ $\cos(3x) - 2$



5. Use trig identities to simplify $\frac{1}{1-\sin(t)} - \frac{1}{1+\sin(t)}$.

6. The fox population in a certain region has a relative growth rate of 8% a year. It is estimated that the population in 2000 was 18,000.

   (i) Find the function that models the population in terms of t, the number of years after 2000.

   (ii) What will the population be in 2008?

   (iii) How long will it take the population to double in size?

7. A ferris wheel has a radius of 10 meters and the bottom of the wheel passes 1 meter above the ground. If the ferris wheel makes one complete revolution every 20 seconds, find an equation that gives the height above the ground of a person on the wheel as a function of time.

8. Each of the following polynomials and rational functions is graphed below. Match the formulas to the correct graphs (shown on $-2 \le x \le 2$).

$\square$ $\cos(\pi x)$ $\square$ $\cos(x)\sin(20x)$ $\square$ $e^{-x} - 2$ $\square$ $\sin(\pi x) + 1$