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

(i) \[\begin{array}{c}
\text{Which of the following numbers is largest?} \\
(a) 2^{20} \\
(b) 3^{10} \\
(c) 4^{10} \\
(d) 8^7 \\
(e) 16^5 \\
(f) 9^9 \\
\end{array}\]

(ii) \[\begin{array}{c}
\text{Simplify } \log_2(8x^4x) \\
(a) 2x \log_2(4x) \\
(b) 3 + \log_2 x + 2x \\
(c) 4 \log_2 x + x \\
(d) 2x + 2 \log_2 x \\
(e) \log_2(4) + (2 + x) \log_2(2x) \\
(f) \text{ none of these.} \\
\end{array}\]

(iii) \[\begin{array}{c}
\text{The number } \log_2 3 \text{ is also equal to} \\
(a) \log_{10} 2/\log_{10} 3 \\
(b) \log_{10} 3/\log_2 3 \\
(c) \ln 3 \\
(d) \ln 3/\ln 2 \\
(e) \ln 2/\ln 3 \\
(f) \text{ none of these.} \\
\end{array}\]

(iv) \[\begin{array}{c}
\text{Solve } 7^{x+2} = 3 \text{ for } x. \\
(a) x = (\ln 7/\ln 3) - 2 \\
(b) x = (\ln 3/\ln 7) - 2 \\
(c) x = (\ln 2/\ln 7) - 3 \\
(d) x = (\ln 7/\ln 3) + 2 \\
(e) x = (\ln 7/\ln 2) + 3 \\
(f) \text{ none of these.} \\
\end{array}\]

(v) \[\begin{array}{c}
\text{Suppose } \sin(t) = .6. \text{ Then } |\cos(t)| = (a) .5 \\
(b) .6 \\
(c) .7 \\
(d) .8 \\
(e) .9 \\
(f) \text{ none of these.} \\
\end{array}\]

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

- \[\sin(x)\] (E)
- \[x^3 \sin(x)\] (O)
- \[e^x\] (E)
- \[\sin^2(x)\] (O)
- \[\sin(x) + \cos(x)\] (N)

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 $0 \leq x \leq 2\pi$. Place the letter of the correct graph in the box next to the corresponding formula.

(i) $\boxed{2 \cos(x)}$
(ii) $\boxed{\sin(2x)}$
(iii) $\boxed{2 + \sin(x)}$
(iv) $\boxed{\cos(x) + \sin(x)}$
(v) $\boxed{\cos(3x) - 2}$

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 $-2 \leq x \leq 2$).

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

   A   B   C   D   E   F   G   H