Name:_____   Precalculus score_____ Calculus score_____

Diagnostic Quiz on Precalculus and Calculus I computational skills

To do well in Calculus II, you need to have excellent precalculus and Calculus I skills. This diagnostic quiz will help you determine where your skills could use some extra practice. **Please give yourself only the time indicated. If you have difficulty with any subquestion, skip it and go on. We will provide a worksheet for each question so that you can practice as needed.**

Part 1: Precalculus - give yourself 10 minutes

1. Find an equation for the line through the points $(3, 0)$ and $(0, 2)$.

2. Graph the following functions, and give the coordinates of where they cross the axes.
   a) $f(x) = \cos x$, $0 \leq x \leq 2\pi$ b) $f(x) = \ln x$ c) $f(x) = e^{-x}$

3. Graph the following curves. Indicate the coordinates of the vertex or center.
   a) $y - 2 = (x - 1)^2$ b) $y^2 + x^2 - 2x = 0$

4. Solve the following inequalities for x. Write your answers in the form $a < x < b$.
   (a) $\left| \dfrac{x - 3}{5} \right| < 1$

   (b) $\sqrt{\dfrac{1}{x}} > 10$

5. Compute the limits.
   (a) $\lim\limits_{x \to 0} \dfrac{x^2 + 2e^x}{x^3 + x + 1}$

   (b) $\lim\limits_{x \to \infty} \dfrac{x^2 + 2\ln x}{x^3 + x + 1}$

Part 2: Calculus - give yourself 15 minutes

6. Complete this limit definition of the derivative: Given a function f, the derivative of f at a is given by

$$f'(a) = \lim_{h \to 0} \left(\right)$$

7. Give the derivatives of the following functions.

   a) $f(x) = \sec x$
   b) $f(x) = \sqrt{x}$
   c) $f(x) = 2^x$

8. Find the derivative of the following functions.

   (a) $f(x) = [\sin(x + x^2) + x]^4$

   (b) $f(x) = e^{-2x} \cos(3x)$

9. Compute the integrals.

   a) $\displaystyle\int \frac{1}{1 + x^2}\, dx$
   b) $\displaystyle\int \sqrt{x}\, dx$

10. Compute the definite integrals. Simplify as much as possible.

   (a) $\displaystyle\int_0^4 x \sin(x^2)\, dx.$

   (b) $\displaystyle\int_0^3 \frac{x}{1 + 2x^2}\, dx.$