Maple Competency Quiz II

Name _____

You may work together but each person should submit a separate set of solutions. Although Maple will be very helpful for some of these problems, you may solve these problems in any way you see fit.

1. (4 points) Factor the following polynomials.

    (a) $x^2 - 4x + 3$

    (b) $x^{14} - 4x + 3$

2. (4 points) Evaluate the following limits.

    (a) $\lim\limits_{x \to \pi/2} \sin(3x)$

    (b) $\lim\limits_{x \to \infty} \left(\dfrac{2x+3}{2x} \right)^x$ \qquad (Note: a correct answer will involve the constant $e \approx 2.71828$)

3. (9 points) Sketch a graph of $f(x) = 1 - x^2 + 4\cos(2x - 10)$. Your answers to the following questions should be accurate to at least 5 places after the decimal point.

   (a) Find the value of the y-intercept on the graph of $f(x)$.

   (b) How many x-intercepts does the graph of $f(x)$ have? Find the approximate decimal value for each of these x-intercepts.

   (c) Find the maximum value of $f(x)$ and the x-value at which this maximum occurs.

4. (4 points) Given that $f(x) = \sin(\sqrt{x + 2})$, find the approximate decimal value of $f'(-1)$ accurate to at least 5 places after the decimal point.

5. (4 points) Evaluate the integral $\int \cos^3 x \, dx$