Math 201 - HW #1

February 8, 2011

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. Let $a = 1.1122 \times 10^{-5}$ and let $f(x) = \sqrt{x+2} - \sqrt{2}$. For each part of this problem use 5-digit arithmetic with rounding. Use 3.9322×10^{-6} as the exact value of $f(a)$.

    (a) Compute $f(a)$ and determine the relative error in your result.

    (b) Rewrite $f(x)$ in a more appropriate form for evaluation when x is small.

    (c) Use your new form to evaluate $f(a)$ and determine the relative error.

2. Let $p(x) = x^4 + 5x^3 + 8x^2 - 7x + 2$.

    (a) Treating the powers as repeated multiplication, count the number of operations required to evaluate $p(2)$.

    (b) Rewrite $p(x)$ in nested form.

    (c) Using the nested form, how many operations are required to evaluate $p(2)$?

3. Consider the quadratic equation $x^2 - 26x + 1 = 0$.

    (a) Find the exact solutions. Use your calculator to find the decimal form of each solution.

    (b) Use the standard quadratic formula and 5-digit arithmetic with rounding to find the solutions. Compute the relative error in each.

    (c) Use the improved quadratic formula and 5-digit arithmetic with rounding to find the solutions. Compute the relative error in each.