Homework III First-Half

Due in class June 13 2017

0. Read the following sections:

Chapter 7 Derivatives in Use: Section 7.4 Linear Approximations, 7.5 Polynomial Approximations

1. Find the linear approximation to $f(x) = (5x + 3)^{-2}$ about $x = 0$

2. Prove that for x close to 0, $\sqrt{1 + x} \approx 1 + \frac{x}{2}$

3. Find the differential $d(x^p + e^x)$, where p is a constant

4. Approximate the value of $\sqrt[3]{1.1}$ by using linear approximation of $f(x) = \sqrt[3]{x}$

5. Find the quadratic approximation to $f(x) = e^{-x^2}$ around $x = 0$

6. Show that the quadratic approximation to $f(x) = ax^2 + bx + c$ around $x = 0$ is $f(x)$ itself