

# MAT 137 (Calculus II) Prof. Swift

Approximating  $\sqrt{104}$  with a Taylor polynomial

Do not use a calculator for problems 1 and 2.

1. Find the degree 2 Taylor polynomial  $T_2(x)$ , centered at  $a = 100$ , for the function  $f(x) = \sqrt{x} = x^{1/2}$ . Leave fractions in your answer, and do not use decimals.
2. Use the fact that  $f(x) \approx T_2(x)$  near  $x = 100$  to approximate  $\sqrt{104}$ . Get an approximation as a sum involving fractions, then evaluate that approximation as an exact decimal. Your final answer will be a sentence,  $\sqrt{104} \approx$  .
3. Use a calculator or the web to write  $\sqrt{104}$ , rounded to 7 significant figures.