

# Chapter 3.9: Linear Approximation

## Calculus I

College of the Atlantic. Fall 2014

1. Consider  $f(x) = 1/x$ .
  - (a) Find the local linearization (aka tangent line approximation) to  $f(x)$  at  $x = 2$ .
  - (b) Use your approximation to estimate  $f(2.1)$ .
  - (c) Make a very rough sketch  $f(x)$  near  $x = 2$ .
  - (d) Is your estimate too high or too low? Use a graph of  $f(x)$  to support your reasoning.
  
2. Find the local linearization of  $\sin(\theta)$  at  $\theta = 0$ .
  
  
  
  
  
  
  
  
  
  
3. Find the local linearization of  $\cos(\theta)$  at  $\theta = 0$ .
  
  
  
  
  
  
  
  
  
  
4. Find the local linearization of  $e^{3x}$  at  $x = 0$ .
  
  
  
  
  
  
  
  
  
  
5. Let  $g(x) = \sqrt{4 + 3x^2}$ . Find the local linearization of  $g(x)$  at  $x = 3$ .