

# Linear Approximation.

Spring 2016

Attendance Quizzes

February 22, 2016

# Quiz 13 Linear Approximation.

- 1 Consider the function:

$$f(x, y) = \sqrt{x^2 + y^2} \text{ and note } f(5, 12) = 13.$$

Use “Linear Approximation” to estimate the quantity  $\sqrt{4.8^2 + 12.1^2}$ . **Show work.** Final answer **must be simplified and reported as a single decimal.**

**Answer:** Note that  $\Delta x = -0.2$ ,  $\Delta y = 0.1$  and

$$L(x, y) = f(5, 12) + f_x(5, 12)x + f_y(5, 12)y = 13 + 5/13(x) + 12/13(y).$$

Hence

$$f(4.8, 12.1) \approx L(-0.2, 0.1) = 13 + \frac{5}{13}(-0.2) + \frac{12}{13}(0.1) = 13.0154$$