

## MATH 1A – QUIZ 7

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Name: \_\_\_\_\_

**Instructions:** You have 16 minutes to take this quiz, for a total of 10 points. **Show your work!** May your luck be (locally) maximized :)

(1) (3 points) Use linear approximation or differentials (**but not both**) to estimate:

$$\sqrt[3]{7.98}$$

Is your answer an underestimate or an overestimate? Explain **very briefly** (roughly 1 sentence) and with the help of a graph.

(2) (1 point) **TRUE/FALSE**. No justification required, but any wrong/blank answer will automatically give you 0/1.

T/F  $\ln(Pe^{yam}) = Pyam$ , where  $P, a, m$  are constants

T/F  $\frac{d}{dx} 10^x = x10^{x-1}$

T/F  $\frac{d}{dx} \ln(10) = \frac{1}{10}$

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Date: Friday, November 1st, 2013.

- (3) (3 points) The angle of elevation of the sun (that is, the angle between the sun and the building) is decreasing at a rate of  $\frac{1}{4}$  rad/h. How fast is the shadow cast by a 400 ft-tall building increasing/decreasing when that angle of elevation is  $\frac{\pi}{6}$ ?

- (4) (3 points) Show that:

$$-\sqrt{2} \leq \cos(x) + \sin(x) \leq \sqrt{2}$$