Math 114 Assignment 4
Due: Friday Nov 18 by Noon, 12:00pm.

Section 2.8 10, 30

10. Suppose $4x^2 + 9y^2 = 36$, where x and y are functions of t.
(a) If $dy/dt = \frac{1}{3}$, find dx/dt when $x = 2$ and $y = \frac{2}{3}\sqrt{5}$.
(b) If $dx/dt = 3$, find dy/dt when $x = -2$ and $y = \frac{2}{3}\sqrt{5}$.

30. A kite 100 ft above the ground moves horizontally at a speed of 8 ft/s. At what rate is the angle between the string and the horizontal decreasing when 200 ft of string has been let out?

Section 2.9 2, 12, 26

1–4 Find the linearization $L(x)$ of the function at a.

2. $f(x) = \sin x, \quad a = \pi/6$

11–14 Find the differential dy of each function.

12. (a) $y = \dfrac{1 + 2u}{1 + 3u}$ (b) $y = \theta^2 \sin 2\theta$

23–28 Use a linear approximation (or differentials) to estimate the given number.

26. $\sqrt{100.5}$

Section 3.1 22, 40, 42, 52

15–28 Sketch the graph of f by hand and use your sketch to find the absolute and local maximum and minimum values of f. (Use the graphs and transformations of Sections 1.2 and 1.3.)

22. $f(t) = \cos t, \quad -3\pi/2 \leq t \leq 3\pi/2$

29–42 Find the critical numbers of the function.

40. $g(\theta) = 4\theta - \tan\theta$

42. $g(x) = \sqrt{1 - x^2}$

45–56 Find the absolute maximum and absolute minimum values of f on the given interval.

52. $f(x) = \dfrac{x}{x^2 - x + 1}, \quad [0, 3]$

Section 3.2 18

18. Let $f(x) = 2 - |2x - 1|$. Show that there is no value of c such that $f(3) - f(0) = f'(c)(3 - 0)$. Why does this not contradict the Mean Value Theorem?