21-111 Calculus I - Fall 2004

Solutions to Review 2

October 18, 2004

1) length = 10 inches

2) L: $y = -3x + 11$, L_1: $\frac{1}{3}x + \frac{2}{3}$, L_2: $y = -3x + 4$

3b) 27500, 3c) 11 years, 3d)$ 7500

4a) $\frac{1}{2\sqrt{x+1}}$, 4b)$-\frac{2}{x^3}$

5a) 12, 5b) $\frac{5}{4}$,

6a) 0, 6b) $\frac{13}{4}$ 6c) ∞, 6d)$-\frac{1}{16}$, 6e)$\frac{3}{2}$

7a) continuous on all of the real numbers, differentiable everwhere but $x = -1$
7b) not defined at $x = 1$ and hence not continuous nor differentiable at $x = 1$. (Note that if we define $f(1) = 2$ we can make this function both continuous and differentiable.)

8) $\frac{d^2y}{dx^2} = \frac{9}{4}x^{-\frac{5}{2}} + 12x^2$ and $\left.\frac{d^2y}{dx^2}\right|_{x=2} = \frac{9\sqrt{2}}{32} + 48$

9a) 56.34 m/s

9b) 58-1.66a

9c)$\frac{58}{0.83} \approx 69.6$ seconds

9d) -58 m/s

9e) H"(t)=1.66 for all t.

10a)6600 10b) \$20.25 per unit 10c) \$20.5 per unit

11) rel. max.: $f(1) = 1$ no rel. max. for $g(x)$,

rel. min.: No rel. min. for $f(x)$ or $g(x)$

abs. max.: $f(1) = 1, g(-1) = 27$

abs. min.: $f(-1) = f(3) = -3, g(3) = -1$

points of inflection: none for $f(x)$, $g(2) = 0$

$f(1) = g(1) = 1$ and $f(2) = g(2) = 0$

$f(0) = f(2) = 0$ and $g(2) = 0$