Math 115 Winter 10 Final Answers

1) a) $4x^3\cos(x) - x^4\sin(x)$

b) $-\dfrac{5}{(2+7x)^2}$

c) $(9+3x^2)\sec(9x+x^3)\tan(9x+x^3)$

2) $(5/2)(x-1) = y-2$

3) a) Increasing on $(\dfrac{-3+3\sqrt{33}}{2}, \infty)$ and $(\dfrac{-3-3\sqrt{33}}{2}, 0)$; decreasing on $(-\infty, \dfrac{-3-3\sqrt{33}}{2})$ and $(0, \dfrac{-3+3\sqrt{33}}{2}$. Local mins at $x = \dfrac{-3\pm 3\sqrt{33}}{2}$; local max at $x = 0$

b) Concave up on $(-\infty, -6)$, $(4, \infty)$; concave down on $(-6, 4)$. Inflection points: $x = -6, 4$.

4) a) $2x^5 - x^2 + C$

b) $-\cot(x^3)/3 + C$

c) $56/15$

5) a) -5

b) does not exist

c) $-1/6$

6) a) $\lim\limits_{x\to a^+} f(x) = \lim\limits_{x\to a^-} f(x) = f(a)$.

b) $k = 1$.

7) a) $\sqrt{2} - 1$.

8) a) No, thanks.

b) $\dfrac{1}{2\sqrt{3}}$

9) a) No, thanks,

b) $2\pi \displaystyle\int_0^1 3x - x \sin\left(\frac{\pi x^2}{2}\right)\ dx$

c) $3\pi - 2$.

10) 2 cm by 5 cm