Week 14 Recitation Problems

MATH:113, Recitations 304 and 305

Names: ____

Show that, if $f'(x) = g'(x)$, then $f(x) = g(x) + C$.

What function did we differentiate to get $f(x) = x^4 + 3x - 9$?

If $f(x) = 3x^2 + 8x + 6$ and $g(x) = e^x$, show that:

$\int k \cdot f(x)\, \mathbf{d}x = k \cdot \int f(x)\, \mathbf{d}x$ for k a real number.

$\int f(x) + g(x)\, \mathbf{d}x = \left(\int f(x)\, \mathbf{d}x\right) + \left(\int g(x)\, \mathbf{d}x\right)$.

Give two functions $f(x)$ and $g(x)$ such that $\int f(x) \cdot g(x)\, \mathrm{d}x \neq \int f(x)\, \mathrm{d}x \cdot \int g(x)\, \mathrm{d}x$.

Stop when you reach this point. We'll check in as a class.

Verify that $y(x) = 2e^{2x}$ is a solution to the differential equation $\frac{\mathrm{d}y}{\mathrm{d}x} = 2y(x)$.

Find a solution for the initial value problem $\frac{\mathrm{d}y}{\mathrm{d}t} = -3y(t)$ where $y(t_0) = -3$ for $t_0 = 0$.

Find a solution for the initial value problem $\frac{\mathrm{d}y}{\mathrm{d}x} = -3x^{-2}$ where $y(t_0) = 1$ for $t_0 = 1$.