

Name: Solutions

Math 105B: Winter 2013

Quiz 4: February 15

Correct answers accompanied by incorrect or incomplete work will not receive full credit. Good Luck!

1. Calculate the derivative of

$$y = \frac{3}{x^4} + 5e^x - 9\ln x + \frac{2^x}{6} + e^5$$

$$y = 3x^{-4} + 5e^x - 9\ln x + \frac{1}{6} 2^x + e^5$$

$$y' = -12x^{-5} + 5e^x - 9\left(\frac{1}{x}\right) + \frac{1}{6}(\ln 2)2^x$$

2. Calculate the antiderivative of

$$f(x) = \frac{3}{x^4} + 5e^x - 9x^{-1} + \frac{2^x}{6} + e^5$$

$$f(x) = 3x^{-4} + 5e^x - 9x^{-1} + \frac{1}{6} 2^x + e^5$$

$$\text{antiD} = F(x) = \frac{3x^{-3}}{-3} + 5e^x - 9\ln|x| + \frac{1}{6} \frac{2^x}{\ln 2} + e^5 x + C$$

$$F(x) = -x^{-3} + 5e^x - 9\ln|x| + \frac{2^x}{6\ln 2} + e^5 x + C$$

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3. Solve the initial value problem

$$y' = 2x^7 - x^2, \quad y(1) = 2$$

$$y = \frac{2x^8}{8} - \frac{x^3}{3} + C$$

$$2 = \frac{2}{8} - \frac{1}{3} + C$$

$$2 = \frac{3}{12} - \frac{4}{12} + C$$

$$2\frac{1}{12} = C$$

$$y = \frac{1}{4}x^8 - \frac{1}{3}x^3 + 2\frac{1}{12}$$

4. Solve the initial value problem

$$y' = 0.6y, \quad y(0) = 21$$

$$y = Ae^{kt}$$

$$A = 21$$

$$k = 0.6$$

$$y = 21e^{0.6t}$$