

Math 105 Quiz 6 Solutions

§3.3, 3.4, 3.5

Name:

Show all work for credit. You do not need to simplify these answers. This quiz may not have “pretty” numbers.

1. Find $\frac{dy}{dx}$ at the point (1,-1) for $-3x^3 - y^3 = x^2y$.

$$-9x^2 - 3y^2y' = 2xy + x^2y'$$

$$y' = \frac{2xy + 9x^2}{-3y^2 - x^2}$$

$$y'(1, -1) = \frac{-7}{4}$$

2. Use logarithmic differentiation to find y' . It is okay, to save time, to leave y in your final answer and not replace it with the given function.

$$y = \frac{(\cos x)^5(3x - 4)^3e^{x^3}}{\sin(3x)(3x^3 - 4x + 5)^4}$$

$$y' = \left(\frac{-5\sin(x)}{\cos(x)} + \frac{9}{3x - 4} + 3x^2 - \frac{3\cos(3x)}{\sin(3x)} - \frac{36x^2 - 16x}{3x^3 - 4x + 5} \right) y$$

3. Determine the antiderivative of the following. Check your answer.

(a)

$$f(x) = \frac{2}{1 + 5x^2}$$

$$F(x) = \frac{2}{\sqrt{5}} * \arctan(\sqrt{5}x) + C$$

(b)

$$f(x) = \frac{x}{1 + x^2}$$

$$F(x) = \frac{1}{2}\ln(1 + x^2) + C$$