

Math 220 Section 6 Quiz 5

7 October 2015

Name: Answer Key

1. If $y = \ln(x^2 + 1)$, find $\frac{d^3y}{dx^3}$.

$$\frac{dy}{dx} = \frac{2x}{x^2+1}$$

$$\frac{d^2y}{dx^2} = \frac{(x^2+1)(2) - (2x)(2x)}{(x^2+1)^2} = \frac{2x^2+2-4x^2}{(x^2+1)^2} = \frac{-2x^2+2}{(x^2+1)^2}$$

$$\frac{d^3y}{dx^3} = \frac{(x^2+1)^2(-4x) - (-2x^2+2)(2(x^2+1)(2x))}{(x^2+1)^4}$$

2. If $(x^2 + y^3)^5 = 2xy$, find $\frac{dy}{dx}$.

$$5(x^2+y^3)^4(2x+3y^2\frac{dy}{dx}) = 2x\frac{dx}{dx} + 2y$$

$$10x(x^2+y^3)^4 + 15y^2(x^2+y^3)^4\frac{dy}{dx} = 2x\frac{dx}{dx} + 2y$$

$$\frac{10x(x^2+y^3)^4 - 2y}{2x - 15y^2(x^2+y^3)^4} = \frac{dx}{dx}$$