

Math 1171

Homework #6

#8, 13, 22, 44b

#8

$$x^3 - xy^2 + y^3 = 1$$

$$3x^2 - (x \cdot 2y y' + y^2) + 3y^2 y' = 0$$

$$(-x \cdot 2y + 3y^2) y' = y^2 - 3x^2$$

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

#13

$$\sin(x+y) = \cos x + \cos y$$

$$\cos(x+y) (1 + y') = -\sin x - \sin y \cdot y'$$

$$\cos(x+y) + \cos(x+y) y' = -\sin x - \sin y y'$$

$$(\cos(x+y) + \sin y) y' = -\sin x - \cos(x+y)$$

$$y' = \frac{-\sin x - \cos(x+y)}{\cos(x+y) + \sin y}$$

#22  $g(x) + x \sin(g(x)) = x^2$  find  $g'(0)$

$$g'(x) + x \cdot \cos(g(x)) \cdot g'(x) + \sin(g(x)) = 2x$$

plug  $x=0$ :

$$g'(0) + 0 \cdot \text{---} + \sin(g(0)) = 0$$

$$g'(0) = -\sin(g(0))$$

#44

$$2y^3 + y^2 - y^5 = x^4 - 2x^3 + x^2$$

$$6y^2 y' + 2y y' - 5y^4 y' = 4x^3 - 6x^2 + 2x$$

$$y'(6y^2 + 2y - 5y^4) = 4x^3 - 6x^2 + 2x$$

plug  $y'=0$ :

$$0 = 4x^3 - 6x^2 + 2x$$

$$2x(2x^2 - 3x + 1) = 0$$

$$2x(2x-1)(x-1) = 0$$

$$x=0, x=1/2, x=1$$