

Problem Set # 2

2/7/2001

17.3

(#5)

equation of the tangent to $x^3 + y^3 - 3x^2y^2 + 1 = 0$ @ $(1, 1)$

want to find the slope, $\frac{dy}{dx}$

implicit differentiation:

$$\frac{d}{dx} [x^3 + y^3 - 3x^2y^2 + 1] = \frac{d}{dx} 0$$

$$3x^2 + 3y^2 \frac{dy}{dx} - (3x^2(2y) \frac{dy}{dx} + y^2(6x)) = 0$$

$$3y^2 \frac{dy}{dx} - 6x^2y \frac{dy}{dx} = -3x^2 + 6xy^2$$

$$\frac{dy}{dx} (3y^2 - 6x^2y) = -3x^2 + 6xy^2$$

$$\frac{dy}{dx} = \frac{6xy^2 - 3x^2}{3y^2 - 6x^2y} = \frac{3x(2y^2 - x)}{3y(y^2 - 2x^2)} = \frac{x(2y^2 - x)}{y(y - 2x^2)}$$

$$\text{slope @ } (1, 1) = \frac{1(2-1)}{1(1-2)} = \frac{1}{-1} = -1$$

equation of line: $y - 1 = -1(x - 1)$

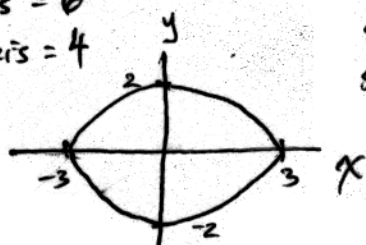
$$y - 1 = -x + 1$$

$$y = -x + 2$$

(#8) a) $4(x-1)^2 + 9(y-3)^2 = 36$

$$\frac{(x-1)^2}{9} + \frac{(y-3)^2}{4} = 1$$

major axis = 6
minor axis = 4



shift up 3 units
shift right 1 unit

