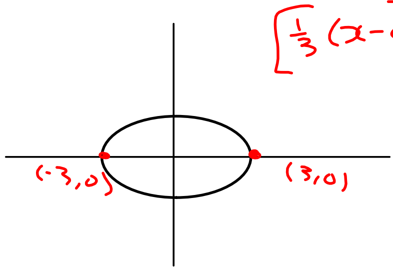
6. Find the slope of the tangent lines to the graph $\frac{x^2}{9}+\frac{y^2}{4}=1$, when $x=1$

$$\left[\frac{1}{3}(x-0)\right]^2+\left[\frac{1}{2}(y-0)\right]^2=1$$



$$\left[\frac{x^2}{9}+\frac{y^2}{4}=1\right]36$$

$$\frac{d}{dx}\left[4x^2+9y^2=36\right]$$

$$\frac{d}{dx}[4x^2]+\frac{d}{dx}[9y^2]=\frac{d}{dx}[36]$$

$$8x+18y\cdot\frac{d}{dx}[y]=0$$

Homework: Page 107 #1 – 3 (every second letter) 5, 7

$$8x+18y\frac{dy}{dx}=0$$

$$\frac{dy}{dx}=\frac{-8x}{18y}$$

I. $\boxed{\frac{dy}{dx}=-\frac{4x}{9y}}$

II slope when $x=1$ need $y=??$ too

$$4x^2+9y^2=36$$

$$4(1)^2+9y^2=36$$

$$9y^2=32$$

$$y^2=\frac{32}{9}$$

$\sqrt{16}\sqrt{2}$

$y=\frac{\sqrt{32}}{\sqrt{9}}$ OR $y=-\frac{\sqrt{32}}{\sqrt{9}}$

$\boxed{y=\frac{4\sqrt{2}}{3},\ x=1}$ $\frac{dy}{dx}=\frac{-4x}{9y}$ $\boxed{y=-\frac{4\sqrt{2}}{3},\ x=1}$

$$\frac{dy}{dx}=\frac{-4(1)}{9\left(\frac{4\sqrt{2}}{3}\right)} \qquad \frac{dy}{dx}=\frac{-4(1)}{9\left(-\frac{4\sqrt{2}}{3}\right)}$$

$$\frac{dy}{dx}=\frac{-1}{3\sqrt{2}} \qquad \frac{dy}{dx}=\frac{1}{3\sqrt{2}}$$

P107

3c

$y^5 + x^2y^3 = 10 \qquad P(-3,1)$

tangent line

$m = \frac{dy}{dx}$

$P(-3,1)$

equation

$$\frac{d}{dx}[y^5] + \frac{d}{dx}[x^2y^3] = \frac{d}{dx}[10]$$

$f = x^2 \qquad g = y^3$

$f' = 2x \qquad g' = 3y^2\frac{dy}{dx}$

$$5y^4\frac{dy}{dx} + \left[(2x)(y^3) + (x^2)(3y^2\frac{dy}{dx})\right] = 0$$

$$5y^4\frac{dy}{dx} + 2xy^3 + 3x^2y^2\frac{dy}{dx} = 0$$

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

$$\frac{dy}{dx}\left[5y^4 + 3x^2y^2\right] = -2xy^3$$

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

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

$P(-3,1)$

$$m = \frac{-2(-3)(1)}{5(1)^2 + 3(-3)^2} = \frac{6}{5+27} = \frac{6}{32}$$

$\boxed{m = \frac{3}{16}} \quad \boxed{P(-3,1)} \quad \boxed{P(x,y)}$

$$\frac{3}{16} = \frac{y-1}{x+3}$$

$3(x+3) = 16(y-1)$

$3x + 9 = 16y - 16$

$3x - 16y + 25 = 0$