Questions? 4.2

In Exercises 27–30, use implicit differentiation to find dy/dx and then d^2y/dx^2 .

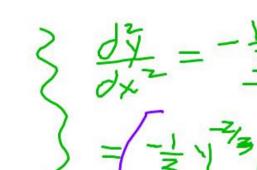
Exercises 27–30, use implicit differentiation to find
$$dy/dx$$
 and en d^2y/dx^2 .

28. $x^{2/3} + y^{2/3} = 1$

$$\int_{-\infty}^{\infty} \frac{dy}{dx} = 1$$

28.
$$x^{2/3} + y^{2/3} = 1$$

$$\frac{2}{3} \left(x^{2/3} + y^{2/3} = 1 \right)$$



$$\begin{cases} \frac{\partial x}{\partial x} = \frac{1}{3} \\ \frac{1}{3} = \frac{1}{3} \end{cases}$$



In Exercises 17–26, find the lines that are (a) tangent and (b) normal to the curve at the given point.

24.
$$x \sin 2y = y \cos 2x$$
, $(\pi/4, \pi/2)$

$$\frac{0}{0} \left[x \sin 2y = y \cos 2x \right]$$

$$(1) \operatorname{SinZy} + \times \operatorname{cosZy}(zy') = y' \operatorname{cosZx} + y(-\sin zx)(z)$$

(a) Find
$$\frac{dy}{dx}$$
.

(b) Find an equation for the tangent line at each point on the curve with x-coordinate 1.

(c) Find the x-coordinate of each point on the curve where the tangent line is vertical.

(a) Find $\frac{dy}{dx}$.

(b) Find an equation for the tangent line at each point on the curve where the tangent line is vertical.

ine is vertical.

b)
$$x=1$$
 y^2y
 $(1,3)$

$$xy-x^3=D$$

$$xy-x^2=D$$

$$xy-x^2=D$$

$$\frac{70x}{2xy-x^{3}} = D$$

$$\frac{70x}{2xy-x^{2}} = D$$

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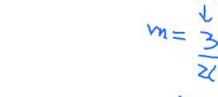
4. Free Response A curve in the xy-plane is defined by

 $xy^2 - x^3y = 6.$

$$2xy-x^{3}=D$$

$$(2y-x^{2})=D$$





y-x5=6;-x5=6; x5=-24

Y=3

$$y^{2}y - 6 = 0 \Rightarrow (y-3)(y+2) = 0$$

 $(1,3)(1,-2)$ $y = 3, y = -2$
 $= 3(1)(3)-9$ $= 30)(-2)$

a) (1) y + xzy(x) - [3x2y +x36x)

$$\frac{2}{5} = 0$$

$$\frac{2(1)(-2) - 4}{2(1)(-2) - 1} = \frac{-10}{-5} = \frac{10}{5} = \frac{10}$$

$$\lambda + 5 = 5(x-1)$$

In Exercises 9–12, find
$$dy/dx$$
 and find the slope of the curve at the indicated point.

indicated point.
12.
$$(x + 2)^2 + (y + 3)^2 = 25$$
, $(1, -7)$

Exercises 9–12, find ay/ax and find the stope of the curve at the dicated point.
2.
$$(x + 2)^2 + (y + 3)^2 = 25$$
, $(1, -7)$

$$\frac{2(x+z)(1)}{2y} + \frac{2(y+3)}{2} \frac{dy}{dy} = 0$$

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

 $=\frac{-(1+2)}{-7+2}=\frac{-3}{-4}=\frac{3}{4}$

$$\frac{dy}{dy} = -\frac{2(x+z)}{2(y+3)} = \frac{-(x+z)}{y+3} + \frac{-(x+z)}{(1-z)}$$

$$\frac{(1-3)^{(1)} + 2(y+3)}{2} = 0$$

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

$$\frac{(1-3)^{(1)} + 2(y+3)}{2} = 0$$

$$\frac{(x+2)^{(1)} + 2(y+3)}{y+3} = 0$$

In Exercises 13–16, find where the slope of the curve is defined.

16.
$$x^2 + 4xy + 4y^2 - 3x = 6$$

$$2x + 4(10) + 84 \frac{dy}{dx} - 3 = 0$$

$$\frac{\partial y}{\partial x}(4x+8y) = 3-2x-4y$$

$$\frac{\partial y}{\partial x} = \frac{3 - 2x - 4y}{4x + 8y}$$