Find $\frac{dy}{dx}$.

1) $4x^2y - 3y = x^3 - 1$

Method of Separating Variables:

Find dy/dx .

1) $4x^2y - 3y = x^3 - 1$

Method of Implicit Differentiation:

Implicit Differentiation:
taking the derivative when there are multiple variables

2) $y^3 + 7y = x^3$

3) $1 = x^2 y + y$

$$0 = 2x\,y + x^2 \cdot \frac{dy}{dx} + 1\frac{dy}{dx}$$

$$-2xy = \frac{dy}{dx}(x^2 + 1)$$

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

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

$$12x^2 + 5y^2 + 5x \cdot 2y \frac{dy}{dx} - 4y \frac{dy}{dx} = 0$$

$$10xy \frac{dy}{dx} - 4y \frac{dy}{dx} = -12x^2 - 5y^2$$

$$\frac{dy}{dx}(10xy - 4y) = -12x^2 - 5y^2$$

$$\frac{dy}{dx} = \frac{-12x^2 - 5y^2}{10xy - 4y}$$

5) $y^3 - xy^2 + \cos(xy) = 2$

$$3y^2 \frac{dy}{dx} - 1y^2 + -x \cdot 2y \frac{dy}{dx} + -\sin(xy)\left(1 \cdot y + x1\frac{dy}{dx}\right)$$

$$\boxed{3y^2 \frac{dy}{dx}} - y^2 \boxed{-2xy\frac{dy}{dx}} - \sin(xy)\left(y + x\frac{dy}{dx}\right) = 0$$

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