

1) Encontre dy/dx

a) $x^2y + xy^2 = 6$

$x^2y + xy^2 = 6 \quad / \quad d/dx$

$$2xy + x^2y' + y^2 + x2yy' = 0$$

$$x^2y' + 2xyy' = -2xy - y^2$$

$$y'(x^2 + 2xy) = -2xy - y^2$$

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

b) $2xy + y^2 = x + y$

$2xy + y^2 = x + y \quad / \quad d/dx$

$$2y + 2xy' + 2yy' = 1 + y'$$

$$2xy' - y' = 1 - 2y$$

$$y'(2x - 1) = 1 - 2y$$

$$y' = \frac{1 - 2y}{2x - 1}$$

c) $x^2(x-y)^2 = x^2 - y^2$

$x^2(x-y)^2 = x^2 - y^2 \quad / \quad d/dx$

$$2x(x-y)^2 + x^2 \cdot 2(x-y)(1-y') = 2x - 2yy'$$

$$2x^2(x-y) - 2x^2(x-y)y' + 2yy' = 2x - 2x(x-y)^2$$

$$y'(-2x^2(x-y) + 2y) = 2x - 2x(x-y)^2 - 2x^2(x-y)$$

$$y' = \frac{2x - 2x(x-y)^2 - 2x^2(x-y)}{-2x^2(x-y) + 2y}$$

$$d) \quad y^2 = \frac{x-1}{x+1}$$

$$y^2 = \frac{x-1}{x+1} \quad / \quad d/dx$$

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

$$2y y' =$$

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

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

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

$$e) \quad x^3 - xy + y^3 = 1$$

$$x^3 - xy + y^3 = 1 \quad / \quad d/dx$$

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

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

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

$$f) \quad 6x^2 + 3xy + 2y^2 + 17y - 6 = 0$$

$$6x^2 + 3xy + 2y^2 + 17y - 6 = 0 \quad / \quad d/dx$$

$$12x + 3(y + xy') + 4yy' + 17y' = 0$$

$$y'(3x + 4y + 17) = -12x - 3y$$

$$y' = \frac{-12x - 3y}{3x + 4y + 17}$$

3)

$$(x^2 + y^2)^2 = (x - y)^2$$

$$(x^2 + y^2)^2 = (x - y)^2 \quad / d/dx$$

$$2(x^2 + y^2)(2x + 2yy') = 2(x - y)(1 - y')$$

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

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

$$y' = \frac{2(x - y) - 4x(x^2 + y^2)}{4y(x^2 + y^2) + 2(x - y)}$$

2)

2.1

$$C = 2000 + 100x - 0,1x^2$$

$$C' = 100 - 0,2x$$

$$C'(100) = 100 - 0,2(100) = 80$$

$$C(100) = 11000$$

$$C(101) = 11079,9$$

$$C(101) - C(100) = 11079,9 - 11000$$

$$= 79,9$$

2.2)

$$B(x) = 500x \ln(x+1)$$

$$B'(x) = 500 \ln(x+1) + \frac{500x}{x+1}$$

$$B'(50) = 2456,11$$

2.3)

$$B = 300x e^{0,05x}$$

$$B' = 300 e^{0,05x} + 300x \cdot e^{0,05x} \cdot 0,05$$

$$B'(100) = 267143,69$$

2.4)

$$a) I = \frac{609}{0,019^2 + 1}$$

$$b) I' = \frac{60(0,019^2 + 1) - 609(0,029)}{(0,019^2 + 1)^2}$$

$$c) I'(2) = 53,25$$

3)

2)

$$y = \sqrt{3x^2 - 4x + 6}$$

$$y' = \frac{6x - 4}{2\sqrt{3x^2 - 4x + 6}}$$

b)

$$y = \left(\frac{x^2}{8} + x - \frac{1}{x} \right)^4$$

$$y' = 4 \left(\frac{x^2}{8} + x - \frac{1}{x} \right)^3 \left(\frac{x}{4} + 1 + \frac{1}{x^2} \right)$$

c)

$$y = 3t(2t^2 - 5)^4$$

$$y' = 3(2t^2 - 5)^4 + 3t \cdot 4(2t^2 - 5)^3 \cdot 4t$$

$$y' = 3(2t^2 - 5)^4 + 48t^2(2t^2 - 5)^3$$