Calc p5 155

Prob 9, 10

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

Product Product

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

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

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

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

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

10) $x^3 + y^3 = 18xy$

Product

$3x^2 + 3y^2\frac{dy}{dx} = 18\left(x\frac{dy}{dx} + y(1)\right)$

$3x^2 + 3y^2\frac{dy}{dx} = 18x\frac{dy}{dx} + 18y$

$3y^2\frac{dy}{dx} - 18x\frac{dy}{dx} = 18y - 3x^2$

$\frac{dy}{dx}(3y^2 - 18x) = 18y - 3x^2$

$\frac{dy}{dx} = \frac{18y - 3x^2}{3y^2 - 18x}$