

$$3. \frac{d}{dx}(x^3 + x^2y + 4y^2) = \frac{d}{dx}(6) \Rightarrow 3x^2 + (x^2y' + y \cdot 2x) + 8yy' = 0 \Rightarrow x^2y' + 8yy' = -3x^2 - 2xy$$

$$\Rightarrow (x^2 + 8y)y' = -3x^2 - 2xy \Rightarrow y' = -\frac{3x^2 + 2xy}{x^2 + 8y} = -\frac{x(3x + 2y)}{x^2 + 8y}$$

$$4. \frac{d}{dx}(x^2 - 2xy + y^3) = \frac{d}{dx}(c) \Rightarrow 2x - 2(xy' + y \cdot 1) + 3y^2y' = 0 \Rightarrow 2x - 2y = 2xy' - 3y^2y' \Rightarrow$$

$$2x - 2y = y'(2x - 3y^2) \Rightarrow y' = \frac{2x - 2y}{2x - 3y^2}$$

$$5. \frac{d}{dx}(x^2y + xy^2) = \frac{d}{dx}(3x) \Rightarrow (x^2y' + y \cdot 2x) + (x \cdot 2yy' + y^2 \cdot 1) = 3 \Rightarrow$$

$$x^2y' + 2xyy' = 3 - 2xy - y^2 \Rightarrow y'(x^2 + 2xy) = 3 - 2xy - y^2 \Rightarrow y' = \frac{3 - 2xy - y^2}{x^2 + 2xy}$$

$$6. \frac{d}{dx}(y^5 + x^2y^3) = \frac{d}{dx}(1 + ye^{x^2}) \Rightarrow 5y^4y' + (x^2 \cdot 3y^2y' + y^3 \cdot 2x) = 0 + y \cdot e^{x^2} \cdot 2x + e^{x^2} \cdot y' \Rightarrow$$

$$y'(5y^4 + 3x^2y^2 - e^{x^2}) = 2xye^{x^2} - 2xy^3 \Rightarrow y' = \frac{2xy(e^{x^2} - y^2)}{5y^4 + 3x^2y^2 - e^{x^2}}$$

$$7. \sqrt{xy} = 1 + x^2y \Rightarrow \frac{1}{2}(xy)^{-1/2}(xy' + y \cdot 1) = 0 + x^2y' + y \cdot 2x \Rightarrow \frac{x}{2\sqrt{xy}}y' + \frac{y}{2\sqrt{xy}} = x^2y' + 2xy$$

$$\Rightarrow y' \left( \frac{x}{2\sqrt{xy}} - x^2 \right) = 2xy - \frac{y}{2\sqrt{xy}} \Rightarrow y' \left( \frac{x - 2x^2\sqrt{xy}}{2\sqrt{xy}} \right) = \frac{4xy\sqrt{xy} - y}{2\sqrt{xy}} \Rightarrow y' = \frac{4xy\sqrt{xy} - y}{x - 2x^2\sqrt{xy}}$$