

Sec 3.5 day 1 page 214 (1,3-8)

$$\textcircled{1} a) \quad xy + 2x + 3x^2 = 4$$

$$y + xy' + 2 + 6x = 0$$

$$\frac{xy'}{x} = \frac{-6x - 2 - y}{x}$$

$$\boxed{y' = \frac{-6x - 2 - y}{x}}$$

$$b) \quad y = \frac{4 - 2x - 3x^2}{x} = 4x^{-1} - 2 - 3x$$

$$\boxed{y' = -4x^{-2} - 3}$$

$$\textcircled{1} \quad y' = \frac{-6x - 2 - 4x^{-1} + 2 + 3x}{x}$$

$$= -6 - 2x^{-1} - 4x^{-2} + 2x^{-1} + 3$$

$$\boxed{y' = -4x^{-2} - 3}$$

Same

$$\textcircled{3} \quad x^3 + y^3 = 1$$

$$3x^2 + 3y^2 y' = 0$$

$$3y^2 y' = -3x^2$$

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

$$\textcircled{4} \quad 2x^{1/2} + y^{1/2} = 3$$

$$\frac{2}{2\sqrt{x}} + \frac{y'}{2\sqrt{y}} = 0$$

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

$$\textcircled{5} \quad x^2 + xy - y^2 = 4$$

$$2x + y + xy' - 2yy' = 0$$

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

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

$$\textcircled{6} \quad 2x^3 + x^2y - xy^3 = 2$$

$$6x^2 + 2xy + x^2y' - y^3 - 3xy^2y' = 0$$

$$y'(x^2 - 3xy^2) = -6x^2 - 2xy + y^3$$

$$\boxed{y' = \frac{y^3 - 6x^2 - 2xy}{x^2 - 3xy^2}}$$

$$\textcircled{7} \quad x^4(x+y) = y^2(3x-y)$$

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

$$5x^4 + 4x^3y + x^4y' = 3y^2 + 6xyy' - 3y^2y'$$

$$3y^2y' + x^4y' - 6xyy' = 3y^2 - 5x^4 - 4x^3y$$

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

$$y' = \frac{3y^2 - 5x^4 - 4x^3y}{3y^2 + x^4 - 6xy}$$

$$\textcircled{8} \quad y^5 + x^2y^3 = 1 + ye^{x^2}$$

$$5y^4y' + 2xy^3 + 3x^2y^2y' = y'e^{x^2} + 2xye^{x^2}$$

$$5y^4y' + 3x^2y^2y' - y'e^{x^2} = 2xye^{x^2} - 2xy^3$$

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

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