

① a) $f(x) = x^{1/7}$
 $f'(x) = \frac{1}{7} x^{-6/7}$

b) $f(x) = x^{-9}$
 $f'(x) = -9x^{-10}$

c) $f(x) = 3(1+7x)^4$
 $f'(x) = 12(1+7x)^3(7)$
or $f'(x) = 84(1+7x)^3$

d) $f(x) = 8(1+x^2)^{-1/2}$
 $f'(x) = -4(1+x^2)^{-3/2}(2x)$
or $f'(x) = -8x(1+x^2)^{-3/2}$

(2)

$$2x^3 + (7x)y + y^3 = 0$$

Take $\frac{d}{dx}$:

$$6x^2 + 7x \frac{dy}{dx} + 7y + 3y^2 \frac{dy}{dx} = 0$$

$$7x \frac{dy}{dx} + 3y^2 \frac{dy}{dx} = -6x^2 - 7y$$

$$(7x + 3y^2) \frac{dy}{dx} = -6x^2 - 7y$$

$$\frac{dy}{dx} = \frac{-6x^2 - 7y}{7x + 3y^2}$$