

$$(1) x^2 + y^2 = 2$$

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

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

$$\underline{\underline{\frac{dy}{dx} = -\frac{x}{y}}}$$

$$(2) 2xy - 3 = 0$$

$$2\left(y + x \frac{dy}{dx}\right) = 0$$

$$x \frac{dy}{dx} = -y$$

$$\underline{\underline{\frac{dy}{dx} = -\frac{y}{x}}}$$

$$(3) x^2 + 3xy - y^2 = 1$$

$$2x + 3y + 3x \frac{dy}{dx} - 2y \cdot \frac{dy}{dx} = 0$$

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

$$\underline{\underline{\frac{dy}{dx} = -\frac{2x+3y}{3x-2y}}}$$

$$(4) x = \sin y$$

$$1 = \cos y \cdot \frac{dy}{dx}$$

$$\underline{\underline{\frac{dy}{dx} = \frac{1}{\cos y}}}$$

$$(5) \frac{dx}{dt} = \frac{-2t}{2\sqrt{1-t^2}} = \frac{-t}{\sqrt{1-t^2}}$$

$$\frac{dy}{dt} = 2t \quad \text{f'}$$

$$\frac{dy}{dx} = \frac{2t}{-\frac{t}{\sqrt{1-t^2}}}$$

$$= \underline{\underline{-2\sqrt{1-t^2}}}$$

$$(6) \frac{dx}{dt} = 1 + \cos t$$

$$\frac{dy}{dt} = -\sin t \quad \text{f'}$$

$$\underline{\underline{\frac{dy}{dx} = \frac{-\sin t}{1 + \cos t}}}$$

$$(7) \frac{dx}{dt} = \frac{2t(1-t^2) - (1+t^2) \cdot (-2t)}{(1-t^2)^2}$$
$$= \frac{2t - 2t^3 + 2t + 2t^3}{(1-t^2)^2} = \frac{4t}{(1-t^2)^2}$$

$$\frac{dy}{dt} = \frac{2(1-t^2) - 2t \cdot (-2t)}{(1-t^2)^2}$$

$$= \frac{2t^2 + 2}{(1-t^2)^2} \quad \text{f'}$$

$$\underline{\underline{\frac{dy}{dx} = \frac{2t^2 + 2}{4t} = \frac{t^2 + 1}{2t}}}$$

$$(8) \frac{dx}{dt} = 3a \cos^2 t \cdot (-\sin t)$$

$$= -3a \sin t \cos^2 t$$

$$\frac{dy}{dt} = 3b \sin^2 t \cdot \cos t \quad \text{f'}$$

$$\frac{dy}{dx} = \frac{3b \sin^2 t \cos t}{-3a \sin t \cos^2 t}$$

$$= \underline{\underline{-\frac{b}{a} \tan t}}$$