

$$1. \quad e^y \sin(x) = x + xy$$

$$e^y \frac{dy}{dx} \sin(x) + e^y \cos(x) = 1 + 1y + x \frac{dy}{dx}$$

$$e^y \frac{dy}{dx} \sin(x) - x \frac{dy}{dx} = 1 + y - e^y \cos(x)$$

$$\frac{dy}{dx} (e^y \sin(x) - x) = 1 + y - e^y \cos(x)$$

$$\frac{dy}{dx} = \frac{1 + y - e^y \cos(x)}{e^y \sin(x) - x}$$

2. The slope of the tangent line at $(x, y) = (0, 1)$ is given by $\frac{dy}{dx}$.

$$e^{x/y} = 3x - y + 2$$

$$e^{x/y} \cdot \frac{y \cdot 1 - x \frac{dy}{dx}}{y^2} = 3 - \frac{dy}{dx}$$

$$\text{at } (x, y) = (0, 1):$$

$$1 \cdot \frac{1 - 0}{1} = 3 - \frac{dy}{dx}$$

$$\frac{dy}{dx} = 2$$

Point: $(0, 1)$

Slope: 2

Point-Slope form: $y - 1 = 2(x - 0)$

Slope-Intercept form: $y = 2x + 1$