

1. Solve the differential equation.

(a) $\frac{dy}{dx} = xy^2$

(b) $\frac{dy}{dx} = xe^{-y}$

(c) $(x^2 + 1)y' = xy$ [Hint: rewrite y' as dy/dx first.]

(d) $(y + \sin y)y' = x + x^3$

(e) $\frac{du}{dt} = 2 + 2u + t + tu$

2. Find the solution of the differential equation that satisfies the given initial condition.

(a) $\frac{dy}{dx} = \frac{x}{y}$, $y(0) = -3$

(b) $y' = \frac{\ln(x)}{xy}$, $y(1) = 2$

(c) $\frac{dP}{dt} = \sqrt{Pt}$, $P(1) = 2$

(d) $\frac{du}{dt} = \frac{2t + (\sec t)^2}{2u}$, $u(0) = -5$.

3. Find an equation of the curve that passes through the point $(0, 1)$ and whose slope at (x, y) is xy .