Separation of Variables

1. Solve the given differential equations.

(a) $dx + e^{3x}dy = 0$

(b) $x\frac{dy}{dx} = 4y$

(c) $\frac{dy}{dx} = e^{3x+2y}$

2. Solve the given differential equations.

(a) $\frac{dS}{dr} = kS$

(b) $(e^y + 1)^2 e^{-y}dx + (e^x + 1)^3 e^{-x}dy = 0$

3. Solve the given differential equation.

$\frac{dP}{dt} = P - P^2$

4. Solve the given differential equation.

$\frac{dy}{dx} = \frac{xy+3x-y-3}{xy-2x+4y-8}$

5. Solve the given initial-value problem.

$x^2\frac{dy}{dx} = y - xy$**,** $y(-1) = -1$