

Reduce the differential equations below to a separable differential equation and find its solution.

1. $\left(\frac{x+y-a}{x+y-b}\right) \frac{dy}{dx} = \frac{x+y+a}{x+y+b}$ Hint. $x + y = u$

2. $\frac{dy}{dx} = \sin(x + y) + \cos(x + y)$ Hint. $x + y = u$

3. $x^2(xdx + ydy) + 2y(xdy - ydx) = 0$ Hint. $x = r \cos \theta, y = r \sin \theta$

4. $\frac{dy}{dx} = (x + e^y - 1)e^{-y}$ Hint. $x + e^y = u$

5. $x \frac{dy}{dx} = e^{-xy} - y$ Hint. $xy = u$