

Separation of Variables Problems

Solve the following initial value problems. Write in the form $y = \underline{\hspace{2cm}}$

1. $\frac{dy}{dx} = \frac{5x}{y}, \quad y(0) = -4$

2. $\frac{dy}{dx} = x(1+y), \quad y(0) = 2$

3. $(1+x^2)\frac{dy}{dx} = 2xy, \quad y(0) = -2$

4. $\frac{dy}{dx} = xy^2, \quad y(1) = 0$

5. $\frac{dy}{dx} = 4x\sqrt{1-y}, \quad y(0) = 0$

6. $x + 2y\sqrt{x^2 + 1} \frac{dy}{dx} = 0, \quad y(0) = 1$