

Separable Differential Equations

Solve the following equations with the given initial values, and then write the domain.

1) $\frac{dy}{dx} = xy$ (0,4)

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

3) $\frac{dy}{dx} = 4x^3y$ (1,1)

4) $\frac{dy}{dx} = (xy)^3$ (1,1)

5) $\frac{dy}{dx} = xy - y$ (0,4)

6) $\frac{dy}{dx} = \frac{2}{y}$ (1,-3)

7) $\frac{dy}{dt} = ky$ (0,10) & (1,3)

8) $\frac{dP}{dt} = kP - k$ (0,4) & (2,10)

9) $\frac{dy}{dt} = \frac{2y}{t}$ (-1,4)

10) $\frac{dy}{dx} = ky$ (0,1) & (2,10)

Answers

1) $y = 4e^{\frac{x^2}{2}}$

2) $y = \frac{-2}{x^2 - 18}$

3) $y = e^{x^4 - 1}$

4) $y = \sqrt{\frac{-2}{x^4 - 3}}$

5) $y = 4e^{\frac{x^2}{2} - x}$

6) $y = -\sqrt{4x + 5}$

7) $y = 3t$

8) $P = 3e^{\frac{\ln 3}{2}t} + 1$

9) $y = 4t^2$

10) $y = e^{\frac{\ln 10}{2}t}$