

Math 122 - #13
Differential Equations

Solve the following differential equations:

1. $\frac{dy}{dx} = \frac{2y}{x}$

2. $\frac{dy}{dx} = x^2y^3$

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

4. $2x(y+1) - yy' = 0$

5. $y' = y^2(1+x^3), \quad y(0) = 5$

6. $e^{x^2}y' = xe^y, \quad y(0) = 0$

Answers

1. $y = Cx^2$

2. $y = \pm \sqrt{\frac{-3}{2x^3 + C}}$

3. $y = C(x^2 + 1) + 1$

4. $\ln|y+1| + x^2 - y = C$

5. $y = \frac{-20}{20x + 5x^4 - 4}$

6. $y = -\ln\left|\frac{e^{-x^2} + 1}{2}\right|$