Worksheet 8

Differential Equations

Separable Differential Equations

Problem 1. Determine which of the following are separable differential equations.

a. $\frac{dy}{dx} - y^2x^2 = x^2$ *b.* $\frac{dy}{dx} - y^2 = x^2$ *c.* $\frac{dy}{dx} = e^{x+y}$

d. $\frac{dy}{dx} + 1 = y^2$ *e.* $\frac{dy}{dx} + 2y^2 = x^2 + 1$ *f.* $\frac{dy}{dx} = xy - y^2x$

Problem 2. Find the **general solution** to the differential equation: $\frac{dy}{dx} = e^y x^3$.

(b) Find a solution to the **initial value problem**, where $\frac{dy}{dx} = e^y x^3$ and $y(0) = 0$.

Problem 3. Find the **general solution** to the differential equation: $\frac{dy}{dx} - y^2x^2 = x^2$.

(b) Find a solution to the **initial value problem**, where $\frac{dy}{dx} - y^2x^2 = x^2$ and $y(0) = 1$.

Problem 4. Find the general solution to the differential equation: $\frac{dy}{dx} = \frac{y}{1+x^2}$.

Problem 5. Find the general solution to the differential equation: $\dfrac{dy}{dx} = x^2(y^2 - 1)$.