

Calculus for the life Sciences II  
MAT 1332B, MAT 1332C  
DGDs Week 5

**Solving Separable Differential Equations**

1.

$$\frac{dy}{dx} = y(y - 5) \quad \text{with } y_0 = 1 \quad \text{if } x_0 = 0$$

2.

$$\frac{dy}{dx} = 2y(3 - y) \quad \text{with } y_0 = 5 \quad \text{if } x_0 = 1$$

3.

$$\frac{dy}{dx} = \frac{x + 1}{y} \quad \text{with } y_0 = 2 \quad \text{if } x_0 = 0$$

4.

$$\frac{dy}{dx} = (y + 1)e^{-x} \quad \text{with } y_0 = 2 \quad \text{if } x_0 = 0$$

5.

$$\frac{dy}{dx} = \frac{y + 1}{x - 1} \quad \text{with } y_0 = 5 \quad \text{if } x_0 = 2$$

**Solution:**

1.

$$y = \frac{5}{1 + 4e^{5x}}$$

2.

$$y = \frac{3}{1 - \frac{2}{5}e^{-6(x-1)}}$$

3.

$$y = \sqrt{x^2 + 2x + 4}$$

4.

$$y = -1 + 3 \exp(1 - e^{-x})$$

5.

$$y = 6x - 7$$