6.3 Notes and Examples

Name: Block: Seat:

Solving Separable Differential Equations

1. (a) A differential equation is an equation involving a _____

   (b) A "_____ Differential Equation" is of the form_____

   (c) An example of a differential equation which is NOT separable would be _____

   You will begin to solve ordinary and higher order differential equations in later calculus courses, and solving these are still an area of active research after centuries of work on them.

2. How to solve separable differential equations analytically:

   (a) Collect terms: _____

   (b) _____ both sides, but only one _____ on one side is needed.

   (c) Using the _____, solve for _____

   (d) Finally, solve for _____

3. Consider the differential equation $\frac{dy}{dx} = x + 2$. Find the particular solution $y = f(x)$ to the given differential equation with the initial condition $f(2) = 0$. (When your have your equation check with your TI or Desmos `https://www.desmos.com/calculator/p7vd3cdmei`)

4. Consider the differential equation $\frac{dy}{dx} = \frac{2y}{3x}$. Find the particular solution $y = f(x)$ that goes through the point $(8, 2)$.

5. Find the equation of the curve that passes through the point $(1, 3)$ and has a slope of $\frac{y}{x^2}$.

6. Consider the differential equation $\frac{dy}{dx} = -\frac{2x}{y}$. Find the particular solution $y = f(x)$ to the given differential equation with the initial condition $f(1) = -1$.

7. Consider the differential equation $\frac{dy}{dx} = x^2(y-1)$. Find the particular solution $y = f(x)$ to the given differential equation with the initial condition $f(0) = 3$.