

Homework #1
2015 Due Tuesday, January 27th in recitation

Math 527, UNH spring

Instructions:

1. Solve the following problems, simplifying the solution as much as you can.
2. AWE: Always Write Equations!
3. ADTSTTBOTE: Always Do The Same Thing To Both Sides Of The Equation!
4. Use loose-leaf paper, not pages torn out from a spiral notebook.
5. Staple the pages together in the upper left-hand corner.
6. Write your name, "Math 527, section #" (with your correct section number), and "HW 1" in the upper-right corner of the first page.

Your work, name, and section number must be legible and organized!

Solve the differential equation using separation of variables.

1. $x \frac{dy}{dx} = 4y$

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

3. $\frac{dy}{dx} = \left(\frac{2y+3}{4x+5} \right)^2$

4. $\csc y + \sec^2 x \frac{dy}{dx} = 0$

5. $\frac{dP}{dt} = P - P^2$

Solve the initial value problem using separation of variables.

6. $\frac{dx}{dt} = 4(x^2 + 1), \quad x(\pi/4) = 1$

7. $\frac{dy}{dx} = \frac{y^2 - 1}{x^2 - 1}, \quad y(2) = 2$

8. $x^2 \frac{dy}{dx} = y - xy, \quad y(-1) = -1$

9. $\frac{dy}{dt} + 2y = 1, \quad y(0) = 5/2$

Find all solutions of the differential equation, both a family of solutions parameterized by an arbitrary constant and a singular solution.

10. $\frac{dy}{dx} = x\sqrt{1 - y^2}$

These problem are taken from the Zill textbook, chapter 2.2. About half of them are odd-numbered Zill problems whose solution can be found at the end of the book.