Math 2280   HOMEWORK #5   Name:

Due 9/27/2024, 11:30 A.M.

Solve the following problems and staple your solutions to this cover sheet. (Computer outputs must be put in the appropriate place in the solution, not attached as an appendix. You may physically cut and paste the output in the problem or allow appropriate space in the printout to add your hand written work.)

1. Find the explicit solution of $x \frac{dv}{dx} = \frac{1-4v^2}{3v}$. Assume $x > 0$.

2. Show that $\mu(x, y) = \frac{1}{xy(2x+y)}$ is an integrating factor of the equation $(3xy+y^2)+(x^2+xy)\frac{dy}{dx} = 0$.

3. Identify the equation $(x^2 \sin x + 4y)\, dx + x\, dy = 0$ as separable, linear, exact, or that can be made exact using an integrating factor that is a function of either x alone or y alone. State all that apply.

4. Sec 3.2 #1

5. Sec 3.2 #4

6. Sec 3.2 #9   Must start with the equation 10: $\frac{dp}{dt} = kp$. Solve it and use the given information to find k and C. Hint: Use $t = 0$ for the year 1990. Note: We used a different notation in the class.

7. Sec 3.2 #13   Don't follow the hint in the book. Must start with the equation 14: $\frac{dp}{dt} = -Ap(p-p_1)$. Solve it and use the given information to find A, p_1 and C. Hint: Use $t = 0$ for the year 1990. Note: We used a different notation in the class.

8. Sec 3.2 #24   Must start with $\frac{dx}{dt} = -kx$. Solve it and use the given information to find k and C.

9. Free points!

10. Free points!