

ME203 PROBLEM SET #3

Issued: September 25, 2002

Solutions Available: October 1, 2002

<http://www.mh1.uwaterloo.ca/courses/me203/>

1. Text - Section 2.5
- Problems 3, 7, 13 (integrating factor)
2. Text - Section 2.6
- Problem 13 (homogeneous equation)
- Problem 23 (Bernoulli equation)
- Problem 42 (other transformations)
3. Show that the equation $\frac{dy}{dx} = \frac{2y - x + 5}{2x - y - 4}$ can be made homogeneous by the substitutions $y = y^* - k$ and $x = x^* - h$. Find the constants k and h .
4. (From S99 Final Exam). The equation $(x^2y + y^3)dy + xdx = 0$ is not exact. Find an appropriate integrating factor and solve it.
5. (From S99 Midterm). Find the general solution of the equation: $x^2 \frac{dy}{dx} = (x^2 + y^2)$