

MA483
Spring 2001

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The following selection of problems will allow us to get acquainted and review facts from calculus.

Homework #1. Due Wednesday, 19 January.

- Strauss, §1.2 #1, 6. Hint: In #6, sketch the characteristic curves in the (x, y) plane. Find all curves which pass through the y -axis.
- Additional problem 1. If $r = \sqrt{x^2 + y^2}$ and $u(x, y) = f(r)$, compute and simplify $u_{xx} + u_{yy}$. Hint: Use the chain rule to write

$$\frac{\partial u}{\partial x} = \frac{df}{dr} \frac{\partial r}{\partial x}.$$

Repeat to find the second derivative.

- Additional problem 2. Solve the ordinary differential equation

$$\frac{dy}{dx} = y^2 \quad y(0) = 2.$$

Hints: Rewrite as $dy/y^2 = dx$. Integrate. Don't forget $+C$. Solve to express y in terms of x and find C using that $y(0) = 2$.

January 11, 2001