

# MATH 2208: ORDINARY DIFFERENTIAL EQUATIONS

## ASSIGNMENT 3

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Fall 2019

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Due: Feb 12

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### Reading

Section 1.(5,6) from the textbook.

### Exercises

Don't forget to be neat and thorough. No fringe, and please use the cover page.

#### ■ Question 1.

Book problem 1.5.(2,12,14,18).

#### ■ Question 2.

Book problems 1.6.(4, 16, 6, 18, 22, 23, 24, 28, 32, 36).

### Additional Problems

#### ■ Question 3.

A function  $y(t)$  is called periodic with period  $T > 0$ , if for every  $t$  in the domain of  $y$  the following holds:

$$y(t + T) = y(t)$$

You are familiar with periodic functions. For example  $\sin(t)$  or  $\cos(3t)$  are periodic functions. We will assume constant functions are not periodic. So your question is as follows:

Let  $f(y)$  be a function such that  $f(y)$  and  $\frac{df}{dy}$  are continuous for all  $y$ . Show that there is no periodic solution to the autonomous ODE  $\frac{dy}{dt} = f(y)$ .