

# Homework 1

Ordinary Differential Equations

UCR Math-046-E01, Summer 2018

1. Recall what the terms *independent variable* and *dependent variable* mean. For this course,  $y$  will always be the dependent variable corresponding to an independent variable, either  $x$  or  $t$ ,

2. Suppose that

$$y' = 2t^3 + \frac{1}{7t} - \sin(2t).$$

Write down the *general* form of  $y$  as a function of  $t$ . (HINT: this is just another way of phrasing a question you were asked many many times in your integral calculus class.) What must  $y$  be *in particular* if we know that  $y = \frac{1}{2} \cos(2)$  when  $t = 1$ ?

3. Now suppose that

$$y'' = x^2 + 3.$$

but we know that  $y = -4$  and  $y' = 2$  when  $x = 0$ . What must  $y$  be? This, and the previous question, are commonly called *initial value problems*.

4. What is the definition of a *differential equation*? Be sure to write down a definition that you would be proud to write down if you were asked this question on an exam.