

# Math 1410: Worksheet 1

August 20, 2021

Name: \_\_\_\_\_

1. Consider the following two functions:

$$f(x) = \begin{cases} -2 & \text{if } x < 1 \\ 3x - 5 & \text{if } 1 \leq x < 4; \\ -(x + 4) + 7 & 4 \leq x \end{cases} \quad g(x) = 2x - 1$$

- (a) Graph both functions. On what intervals are they increasing/decreasing/constant?
- (b) Determine the  $y$ -intercept and any  $x$ -intercepts of the two functions.
- (c) Show that  $f \circ g \neq g \circ f$  by finding an input  $a$  so that  $f(g(a)) \neq g(f(a))$ .
- (d) Determine  $f(x) - g(x)$ .

2. Consider the following functions:

$$a(t) = t^2 - t; \quad b(t) = 2t - 1$$

- (a) What is the longterm end behavior of these functions? That is, what happens to  $a(t)$  and  $b(t)$  as  $t$  approaches  $\pm\infty$ ?
- (b) Determine  $a(b(t))$  and  $b(a(t))$ .
- (c) Determine  $a(2c - 1)$  and  $b(2c - 1)$ , where  $c$  is a constant.