

## MATH 142A HOMEWORK 9

WINTER 2022

**Due: Sunday, March 13, 11:59 PM** (via Gradescope)

All exercises below are from *Ross*:

- 1) Exercise 30.2 – 2 points
- 2) Exercise 30.4 – 2 points
- 3) Exercise 30.5 – 2 points
- 4) Exercise 31.2 – 2 points
- 5) Exercise 31.4 – 2 points
- 6) Exercise 31.5 – 2 points
- 7) Problem 7 – 2 points

Let  $f = o(g)$  as  $x \rightarrow x_0$ . Prove that  $f = O(g)$  as  $x \rightarrow x_0$ .

- 8) Problem 8 – 2 points

Show that  $o(O(h)) = o(h)$  as  $x \rightarrow x_0$ . (Hint. Let  $f = o(g)$  as  $x \rightarrow x_0$  and  $g = O(h)$  and  $x \rightarrow x_0$ . Show that  $f = o(h)$ ).

- 9) Problem 9 – 2 points

Let  $f_i = o(g)$  as  $x \rightarrow x_0$  for  $i \in \{1, 2\}$ . Show that  $(f_1 + f_2) = o(g)$  as  $x \rightarrow x_0$ .