

# Math 1610, Honors Calculus, Fall 2026, Worksheet 1

September 4, 2026

Name \_\_\_\_\_

Please write only your own name in the space above.

1. In the context of this problem, the word “proposition” means a statement which can be evaluated in a particular context as either being true or false. We say that the two propositions are the same (i.e.  $P = Q$  when they always evaluate to the same conclusion in the same context).

Suppose  $P$  and  $Q$  are propositions

- define  $PQ$  to be the proposition “ $P$  and  $Q$ ”. That is,  $PQ$  is true exactly when both  $P$  and  $Q$  are true.
- define  $P + Q$  to be the proposition “ $P$  xor  $Q$ ”. That is  $P + Q$  is true exactly when either  $P$  or  $Q$  is true, but not both.

Show that the distributive law holds: for propositions  $P, Q, R$ , we have  $P(Q + R) = PQ + PR$ .

2. Does the set of all propositions, with these operations, give a field? Why or why not?