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Homework 11
Mathematics 2216.01
Due September 30, 2022

1. Suppose that a and b are non-zero integers. Show that $(a, b) = (a, b - qa)$ for any integer q.

2. Suppose that a, b, and c are non-zero integers, $(a, b) = (a, c) = 4$.
(a) Say as much as possible about the value of $(a, b + c)$.
(b) Say as much as possible about the value of (a, bc).

3. Let n be a nonnegative integer, and a any nonnegative real number. Prove that
$$\int_0^1 x^a (\log x)^n \, dx = \frac{(-1)^n n!}{(a + 1)^{n+1}}.$$