

**Fall 2022, Math 522: Preliminary Problem Set 2**  
**Due: Friday, September 9th, 2022**  
**Greatest Common Divisors and the Euclidean Algorithm**

**Preliminary problems.** These problems should be completed before discussion.

(P1) Find  $(522, 402)$  by repeatedly applying the identities  $(a, b) = (a - b, b)$ ,  $(a, b) = (b, a)$ , and  $(a, 0) = a$ . As an example,

$$\begin{aligned}(182, 63) &= (119, 63) = (56, 63) = (63, 56) = (7, 56) = (56, 7) \\ &= (49, 7) = (42, 7) = (35, 7) = (28, 7) = (21, 7) \\ &= (14, 7) = (7, 7) = (0, 7) = (7, 0) = 7.\end{aligned}$$

Show all of your steps!