

**Fall 2022, Math 621: Preliminary Problem Set 1**  
**Due: Thursday, January 27th, 2022**  
**Numerical and Affine Semigroups**

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

(P1) Let  $S = \langle 9, 13, 14, 16 \rangle$ .

(a) Find  $\text{Ap}(S; 9)$ .

(b) Find a numerical semigroup  $S'$  containing  $S$  with  $F(S') = F(S)$ .