Name:

Quiz 1: §3.1-3.2

Complete the following problems to the best of your ability. **SHOW ALL OF YOUR WORK.** Unshown work will not be graded. You may use a calculator.

1. Suppose an artificer is making magic swords. To make a magic short-sword, she needs 4 steel ingots and 1 magic gem. To make a magic longsword, she needs 6 steel ingots and 2 magic gems. Suppose the king has given her 68 ingots and 20 gems, and she needs to make 14 swords. She needs to know how many of each kind of sword she should make to use up all of her materials.

   (a) Choose appropriate variables to represent the number of each kind of sword. Then, set up this problem as a system of equations.

   (b) Convert your system to an augmented matrix.

   (c) Using either algebraic methods, or Gauß-Jordan elimation, find out how many of each kind of sword the blacksmith should make.

2. Use Gauß-Jordan elimination to solve the following systems of equations. If the system is redundant, indicate which variable is arbitrary.

(a)

$$\begin{aligned} -x + 2y - z &= 0 \\ -x - y + 2z &= 0 \\ 2x - z &= 4 \end{aligned}$$

(b)

$$\begin{aligned} 2x - y + z &= 4 \\ 3x - y + z &= 5 \end{aligned}$$