Math 2568 - 1.1 **Learning Check**

Problem 1: Solving a System of Linear Equations

Solve the system of linear equations:

1. $2x + 3y = 5$
2. $4x - y = 3$

Problem 2: Determining the Nature of Solutions

Given the system of equations below, determine whether the system has a unique solution, infinitely many solutions, or no solution without solving it:

1. $x - 32y + 3z = 4$
2. $2x + y - z = 1$
3. $-3x + 4y + 2z = -2$

Hint: Consider using the determinant of the coefficient matrix or row reduction to echelon form.

Problem 3: Application Problem Involving a System of Equations

A company produces two types of gadgets, A and B. The cost to produce one unit of gadget A is $50, and the cost to produce one unit of gadget B is $70. The company spent $7400 on production costs for these gadgets in one day. On that day, they produced a total of 120 units of gadgets. How many units of gadget A and gadget B did the company produce?

Set up and solve the system of equations to find the quantities of gadget A and gadget B produced.

Problem 4: System of Equations with Parameters

Solve the following system of linear equations for x, y, and z, where a and b are parameters:

1. $ax + by = 1$
2. $4x - 2y + z = 0$
3. $y + az = b$

Discuss how the values of a and b affect the existence and uniqueness of the solution.