

# Worksheet 1

## Section 1.1

- Are all triangular systems echelon? If not, write down a triangular system that is not echelon.

Yes.

- Are all echelon systems triangular? If not, write down a echelon system that is not triangular.

No. Consider the system consisting of the single equation  $0 = 0$ .

## Section 1.2

- Find all solutions to the linear sytem of equations given by Example 3 in Section 1.2 in the book. If you're tired of solving linear systems, just look up the answer in the book.

$$2x_1 - 3x_2 + 10x_3 = -2 \quad (1)$$

$$x_1 - 2x_2 + 3x_3 = -2 \quad (2)$$

$$-x_1 + 3x_2 + x_3 = 4. \quad (3)$$

$$(x_1, x_2, x_3) = (2, 2, 0) + s_1(-11, -4, 1).$$

- Explicitly write down 2 solutions. In other words, write down 2 points with actual numbers that solve the linear system.

$$(2, 2, 0), (-9, -2, 1).$$

- Find all solutions the homogenous linear system given by

$$2x_1 - 3x_2 + 10x_3 = 0 \quad (4)$$

$$x_1 - 2x_2 + 3x_3 = 0 \quad (5)$$

$$-x_1 + 3x_2 + x_3 = 0. \quad (6)$$

This is pretty much the same linear system but with the right hand side replaced by zeros.

$$(x_1, x_2, x_3) = s_1(-11, -4, 1).$$

- Call the 2 solutions you found earlier  $a$  and  $b$ . Does  $a - b$  solve the homogenous linear system? The answer should be yes. Can you explain why?

Yes. See homegenous solutions section.