

## Math 4329 Gaussian Elimination and LU Factorization

Name: \_\_\_\_\_

1. Use Gaussian elimination with back substitution to solve the system:

$$x_1 + 2x_2 + 3x_3 = 4$$

$$3x_1 + 4x_2 + x_3 = 6$$

$$2x_1 + 5x_2 + 7x_3 = 2$$

Please specify the multipliers  $m_{21}$ ,  $m_{31}$  and  $m_{32}$ .

2. Use the multipliers from the previous part (b) to form the LU factorization of the coefficient matrix of the linear system.

3. (a) Use Gaussian Elimination to solve the following system after each calculation, round the result to three significant digits:

$$0.143x_1 + 0.357x_2 + 2.01x_3 = -5.173$$

$$-1.31x_1 + 0.911x_2 + 1.99x_3 = -5.458$$

$$11.2x_1 - 4.3x_2 - 0.605x_3 = 4.415$$

(b) Compare the solution to the following one:

$$x_1 = 1, \quad x_2 = 2 \quad \text{and} \quad x_3 = -3.$$

Why does the difference arise ?

(c) Explain what can be done to overcome this issue.