Problem 1:
Learly chemical manufactures three chemicals: A, B, and C. These chemicals are produced via two production processes: 1 and 2. Running process 1 for an hour costs $4 and yields 3 units of A, 1 of B and 1 of C. Running process 2 for an hour costs $1 and produces 1 unit of A and 1 of B. To meet customer demands, at least 10 units of A, 5 of B, and 3 of C must be produced daily. Graphically determine a daily production plan that minimizes the cost of meeting Leary Chemical’s daily demands.

Problem 2:
Farmer Jane Owns 45 acres of Land. She is going to plant each with wheat or corn. Each acre planted with wheat yields $200 profit, each with corn yields $300 profit. The labor and fertilizer used for each acre are given in Table 1. One hundred workers and 120 tons of fertilizer are available. Use linear programming to determine how Jane can maximize profits from her land.

<table>
<thead>
<tr>
<th></th>
<th>Wheat</th>
<th>Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>3 works</td>
<td>2 workers</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>2 tons</td>
<td>4 tons</td>
</tr>
</tbody>
</table>

Table 1: Table 1

Problem 3:
Determine whether the following LPs have unique/non-unique/no solution.
1.
Max $z = x_1 + x_2$
s.t. $x_1 + x_2 \leq 4$
    $x_1 - x_2 \geq 5$
    $x_1, x_2 \geq 0$

2.
Max $z = 4x_1 + x_2$
s.t. $8x_1 + 2x_2 \leq 16$
    $5x_1 + 2x_2 \leq 12$

1
3.

Max \( z = -x_1 + 3x_2 \)

s.t. \( x_1 - x_2 \leq 4 \)
\( x_1 + 2x_2 \geq 4 \)
\( x_1, x_2 \geq 0 \)

4.

Max \( z = 3x_1 + x_2 \)

s.t. \( 2x_1 + x_2 \leq 6 \)
\( x_1 + 3x_2 \leq 9 \)
\( x_1, x_2 \geq 0 \)

Problem 4:

Using Matlab to solve the following problems:

1)

Min \( z = x_1 - x_2 \)

s.t. \( x_1 + x_2 \leq 6 \)
\( x_1 - x_2 \geq 0 \)
\( x_2 - x_1 \geq 3 \)
\( x_1, x_2 \geq 0 \)

2)

Min \( z = 3x_1 + 5x_2 \)

s.t. \( 3x_1 + 2x_2 \geq 36 \)
\( 3x_1 + 5x_2 \geq 45 \)
\( x_1, x_2 \geq 0 \)