Philadelphia University
Department of Basic Sciences and Mathematics

Academic Year:	2016–2017	**Course Name:**	Linear Programming
Semester:	Summer Semester	**Course Number:**	250373
Exam:	Second Exam	**Instructor Name:**	Feras Awad
Exam Date:	08/08/2017	**Student Name:**	________
Exam Day:	Tuesday	**University ID:**	________
Exam Mark:	[20]	**Serial:**	________

1. (6 points) Use the **Big M-method** to solve the following problem.

$$
\begin{aligned}
\text{Maximize} \quad & z = x_1 + 5x_2 + 3x_3 \\
\text{Subject to} \quad & x_1 + 2x_2 + x_3 = 3 \\
& 2x_1 - x_2 = 4 \\
& x_1, x_2, x_3 \geq 0
\end{aligned}
$$

z		RHS
Row 0		
Row 0		
Row 0		
Row 0		
Row 0		

2. (8 points) Find the **optimal tableau** using the **laws of matrices** for the following LP **if** x_2 and s_2 are the **basic optimal solution** set of the problem.

$$\begin{aligned} \text{Maximize} \quad & z = 2x_1 + 5x_2 \\ \text{Subject to} \quad & x_1 + 2x_2 \le 16 \\ & x_1 - \ \ x_2 \le 12 \\ & x_1,\, x_2 \ge 0 \end{aligned}$$

z		RHS
Row 0		

3. (6 points) Determine whether the following problem has

- **unique optimal solution**, or
- **alternative optimal solution(s)**, or
- **unbounded solution**.

$$\begin{array}{ll} \text{Maximize} & z = 2x_1 - x_2 + 3x_3 \\ \text{Subject to} & x_1 - x_2 + 5x_3 \le 10 \\ & 2x_1 - x_2 + 3x_3 \le 40 \\ & x_1,\ x_2,\ x_3 \ge 0 \end{array}$$

z		RHS
Row 0		
Row 0		
Row 0		
Row 0		
Row 0		
Row 0		