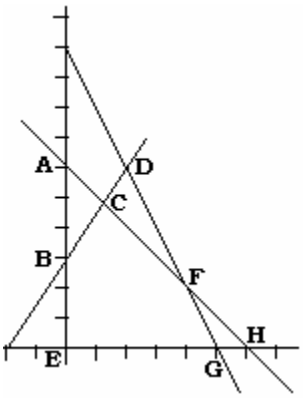
Section A or B (circle) Name _____

56:171 Operations Research Quiz #1 – 6 September 2002

Consider the following LP:



Minimize $3X_1 + 2X_2$

subject to (1) $2X_1 + X_2 \geq 10$

(2) $-3X_1 + 2X_2 \leq 6$

(3) $X_1 + X_2 \geq 6$

$X_1 \geq 0 \,\&\, X_2 \geq 0$

1. The feasible region has ___ corner points, namely _____.
2. At point **F**, the slack (or surplus) variable for constraint # _____ is positive. *(If more than one such variable is positive, only one is required.)*
3. The optimal solution is at point _____

Note: For your convenience, the (X_1, X_2) coordinates of the points labeled above are:

Point	A	B	C	D	E	F	G	H
X_1	0	0	4	2	0	1.2	5	6
X_2	6	3	2	6	0	4.8	0	0

4. Which of the three matrices below (each of which are *row-equivalent* to A) is the result of a "pivot" in matrix A? *(If more than one answer is correct, only one answer is required.)* _____

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 1 & 2 & 1 \\ -2 & -1 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & -1 & -2 \\ 1 & 2 & 1 \\ 0 & 3 & 3 \end{bmatrix}, C = \begin{bmatrix} 1/2 & 0 & -1/2 \\ 1/2 & 1 & 1/2 \\ -1 & 0 & 0 \end{bmatrix}, D = \begin{bmatrix} -1 & 0 & 0 \\ 1 & 2 & 1 \\ -3 & -3 & 0 \end{bmatrix}$$

___5. Which method of solving a system of linear equations requires more row operations?
a. Gauss elimination b. Gauss-Jordan elimination c. Both require same number

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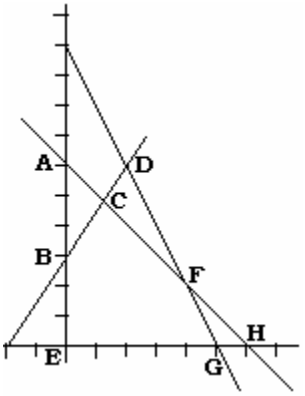
Consider the following LP:



Maximize $3X_1 + 2X_2$

subject to (1) $2X_1 + X_2 \le 10$

(2) $-3X_1 + 2X_2 \le 6$

(3) $X_1 + X_2 \ge 6$

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1. The feasible region has ___ corner points, namely _____.
2. At point **F**, the slack (or surplus) variable for constraint # _____ is positive. *(If more than one such variable is positive, only one is required.)*
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Note: For your convenience, the (X_1, X_2) coordinates of the points labeled above are:

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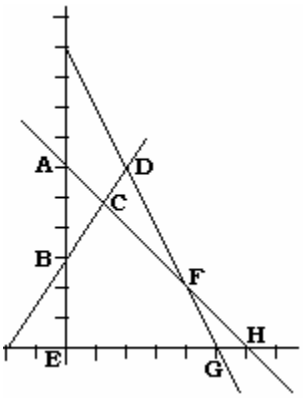

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subject to (1) $2X_1 + X_2 \le 10$

(2) $-3X_1 + 2X_2 \le 6$

(3) $X_1 + X_2 \le 6$

$X_1 \ge 0 \,\&\, X_2 \ge 0$

1. The feasible region has ___ corner points, namely _____.
2. At point **C**, the slack (or surplus) variable for constraint # _____ is positive. *(If more than one such variable is positive, only one is required.)*
3. The optimal solution is at point _____

Note: For your convenience, the (X_1, X_2) coordinates of the points labeled above are:

Point	A	B	C	D	E	F	G	H
X_1	0	0	4	2	0	1.2	5	6
X_2	6	3	2	6	0	4.8	0	0

4. Which of the three matrices below (each of which are *row-equivalent* to A) is the result of a "pivot" in matrix A? *(If more than one answer is correct, only one answer is required.)* _____

$$A = \begin{bmatrix} 2 & 1 & -1 \\ -1 & 2 & 1 \\ -2 & 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & 2 & 0 \\ 1 & -2 & -1 \\ 0 & -3 & -1 \end{bmatrix}, C = \begin{bmatrix} 5/2 & 0 & -3/2 \\ -1/2 & 1 & 1/2 \\ -4 & 0 & 2 \end{bmatrix}, D = \begin{bmatrix} 1 & 3 & 0 \\ -1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$$

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a. Gauss elimination b. Gauss-Jordan elimination c. Both require same number