1. **For a maximisation problem using a Simplex table, we know we have reached the optimal solution when the $z_j - c_j$ row has**

a) **No positive numbers in it**

b) **No numbers in it.**

c) **No non zero numbers in it.**

d) **No negative numbers in it.**

2. **When we are solving a simplex table to solve a maximisation problem, we find that the ratios for determining the pivot row are all negative, then we know that the solution is**

a) **Unbounded**

b) **Infeasible**

c) **Optimal**

d) **Degenerate**

3. **The standard form of**

Max $z = 3x_1 - 8x_2$

$x_1 - x_2 \leq 2$

$x_1 + x_2 \geq 5$

$x_1, x_2 \geq 0$ is

a) **Max $z = 3x_1 - 8x_2$**

$x_1 - x_2 \leq 2$

$-x_1 - x_2 \leq -5$

$x_1, x_2 \geq 0$

b) **Max $z = 3x_1 - 8x_2$**

$x_1 - x_2 + s_1 = 2$

$x_1 + x_2 - s_2 = 5$

$x_1, x_2 \geq 0$

c) **Max $z = 3x_1 - 8x_2$**

$x_1 - x_2 - s_1 = 2$

$x_1 + x_2 + s_2 = 5$

$x_1, x_2, s_1, s_2 \geq 0$

d) **Max $z = 3x_1 - 8x_2$**

$x_1 - x_2 + s_1 = 2$

$x_1 + x_2 - s_2 = 5$

$x_1, x_2, s_1, s_2 \geq 0$

4. For a system with 3 constraints and 5 variables, the solution given by (0, 2, 0, -1, 0) can be a
   a) Basic infeasible solution
   b) Basic infeasible degenerate solution
   c) Basic feasible solution
   d) Basic infeasible non degenerate solution

5. From the following table, answer the questions that follow:

	c_j	4	3	6	0	0	0	
c_B	Basis	X_1	X_2	X_3	S_1	S_2	S_3	b
0	S_1	-2/3	3	0		-2/3	0	380/3
6	X_3	4/3	0	1		1/3	0	470/3
0	S_3	2	5	0		0	1	430

A) What will be the entries in the missing column?
B) Which are the basic variables corresponding to the given table?
C) What is the corresponding solution for the system?
D) Which is the incoming variable?
E) Which is the outgoing variable?
F) What will be the basic variables in the next simplex table?

6. The dual of

Min $Z = 2x_1 + 4x_2$

$x_1 + x_2 \geq 2$

$-x_1 + x_2 \geq -3$

$x_1 \geq 0$, x_2 unrestricted is

a) Max $W = 2y_1 - 3y_2$

   $y_1 - y_2 \leq 2$

   $y_1 + y_2 = 4$

   $y_1, y_2 \geq 0$ is

b) Max $W = 2y_1 - 3y_2$

   $y_1 - y_2 \leq 2$

   $y_1 + y_2 \leq 4$

$y_1, y_2 \geq 0$ is

c) Max $W = 2y_1 - 3y_2$

$y_1 - y_2 \leq 2$

$y_1 + y_2 = 4$

y_1, y_2 unrestricted

d) Max $W = 2y_1 - 3y_2$

$y_1 - y_2 \leq 2$

$y_1 + y_2 \leq 4$

y_1, y_2 unrestricted

7. Which one of the following is true?

a) Optimal solution $\Leftrightarrow$ feasible solution

b) No solution $\Leftrightarrow$ No optimal solution

c) Solution $\Longrightarrow$ Feasible solution

d) No solution $\Longrightarrow$ No feasible solution

8. The right hand side constant in the i^{th} constraint in primal must be equal to objective coefficient for

a) j^{th} primal variable

b) i^{th} dual variable

c) i^{th} primal variable

d) j^{th} dual variable