

OPERATIONS RESEARCH

PRE-TEST EXAM February 4, 2019

IMPORTANT: READ CAREFULLY

The score on the pre-test does not enter the final evaluation .

You answer by crossing the correct answer on the answer paper which is the only you give us back.

Minimum score 6 to be admitted to the written exam.

Given the problem (P)

$$\begin{aligned} \max \quad & f(x) = (x_1 + 3x_2) \\ & (x_1 + x_2)(2x_1 + x_2) \leq 1, \\ & x_1 - x_2 \leq 2, \\ & x_1 + 2x_2 \geq 1 \end{aligned}$$

1. Problem (P) is a nonlinear Problem True False
2. The feasible region of problem (P) is constituted by a quadratic constraint and two linear constraints True False
3. The point $\hat{x} = (0, 1)^T$ is feasible and there is only one active constraint True False
4. The function $f(x)$ is concave True False
5. The gradient $\nabla f(x)$ is a constant vector with three components True False

Given the problem (P₁)

$$\begin{aligned} \min \quad & x_1 - 2x_2 + 5x_3 + x_4 \\ & -2x_1 + x_2 + x_3 = 4 \\ & -\frac{1}{4}x_1 + x_2 \geq -1 \\ & x_1 + 2x_2 + x_4 = 11 \\ & x_i \geq 0 \quad i = 1, \dots, 4 \end{aligned}$$

6. Problem (P₁) is in the standard form for applying the simplex method True False
7. For any pair of feasible points \tilde{x}, \hat{x} , the middle point $\frac{1}{3}\tilde{x} + \frac{1}{3}\hat{x}$ is feasible True False
8. The dual problem of (P₁) is a linear problem with four inequalities constraints True False
9. The solution of Problem (P₁), if it exists, lies on a vertex of the feasible region True False
10. If a LP is unbounded then its dual problem is unbounded too True False

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ANSWER PAPER
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SURNAME NAME

GRADE

Cross the correct answer:
minimum grade 6 to enter the written exam

1. True False

2. True False

3. True False

4. True False

5. True False

6. True False

7. True False

8. True False

9. True False

10. True False