1. A small petroleum company owns two refineries. Refinery 1 costs $20,000 per day to operate, and it can produce 400 barrels of high-grade oil, 300 barrels of medium-grade oil, and 200 barrels of low-grade oil each day. Refinery 2 is newer and more modern. It costs $25,000 per day to operate, and it can produce 300 barrels of high-grade oil, 400 barrels of medium-grade oil, and 500 barrels of low-grade oil each day.
   The company has orders totaling 25,000 barrels of high-grade oil, 27,000 barrels of medium-grade oil, and 30,000 barrels of low-grade oil. How many days should it run each refinery to minimize its costs and still refine enough oil to meet its orders?

2. Use the Simplex Method to

Minimize $3x1 + 2x2$ **subject to all** $xj \geq 0$

and $2x1 + x2 \geq 6$

$x1 + x2 > 4$

3. Use the Simplex Method to

Maximize **$P=5x1 + 3x2$ subject to all $xi \geq 0$**
and **$2x1 + x2 \leq 1$**
$x1 + 4x2 \geq 6$

4. A producer's marginal cost is $MC = 0.75x^2 - x + 400$. What is the total cost TC of producing 3 extra units if 5 units are currently being produced?

5. Find the number of units that must be produced and sold in order to yield the maximum profit, given the following equations for revenue and cost:
   R(x) = 60x - 0.5x2
   C(x) = 5x + 4.

6. The monthly demand function for x newspapers at a newsstand is p = **5 - 0.001x** and the monthly cost function is C = **35 +1.5x** .
   a. Find the monthly revenue ***R*** as a function of x.
   b. Find the monthly profit ***P*** as a function of x.
   c. Find the marginal revenue as a function of x.
   d. Find the marginal profit as a function of x.
   e. Find the profit and the marginal profit for each of the following levels of newspaper production:
      (i) 600 ***(ii)*** 3000