

Optimization WKST

I. Graph each system of inequalities. Find the maximum and minimum values of the given function for this region.

<p>1.</p> $y \leq 5$ $x \leq 4$ $y \geq -x$ $f(x, y) = 5x - 2y$	<p>2.</p> $-3 \leq x \leq 2$ $y \geq -2x - 6$ $4y \leq 2x + 32$ $f(x, y) = -4x - 9y$	<p>3.</p> $-8 \leq y \leq -2$ $y \leq x$ $y \leq -3x + 10$ $f(x, y) = 5x + 14y$
<p>4.</p> $3 \leq y \leq 7$ $2y + x \leq 8$ $y - 2x \leq 23$ $f(x, y) = -3x + 5y$	<p>5.</p> $x \geq -8$ $3x + 6y \leq 36$ $2y + 12 \geq 3x$ $f(x, y) = 10x - 6y$	

II. Find the area of the feasible region bounded by the constraints below.

<p>6.</p> $y \geq x - 3$ $y \leq - x + 3$ $x \geq - y $
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III.

<p>7. A new farm has 240 acres of land are available for plants. Corn yields a profit of \$40/acre and oats yield a profit of \$30/ acre. There are 320 hours available to harvest the plants. Corn takes 2 hours of labor and oats require 1 hour. How many acres of each should be planted to maximize profit?</p>
<p>8. A calculator company produces a scientific calculator and a graphing calculator. Long-term projections indicate an expected demand of at least 100 scientific and 80 graphing calculators each day. Because of limitations on production capacity, no more than 200 scientific and 170 graphing calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators much be shipped each day. If each scientific calculator sold results in a \$2 loss, but each graphing calculator produces a \$5 profit, how many of each type should be made daily to maximize net profits?</p>

ANSWERS

1. max=28, min=-35
2. max=82, min=-89
3. max=-8, min=-152
4. max=59, min=9
5. max=42, min=-140
6. 13.5 units²
7. 80 acres of corn and 160 acres of oats
8. 100 scientific calculators and 170 graphing calculators