Linear Programming 3.7

Overview of problems

🚩 *Example Set: A*

Use the graph to find the maximum value of the objective function:

1.

$$C = 5x - 2y$$

Points labeled on graph: $(0,8)$, $(6,8)$, $(13,3)$, $(0,0)$, $(13,0)$
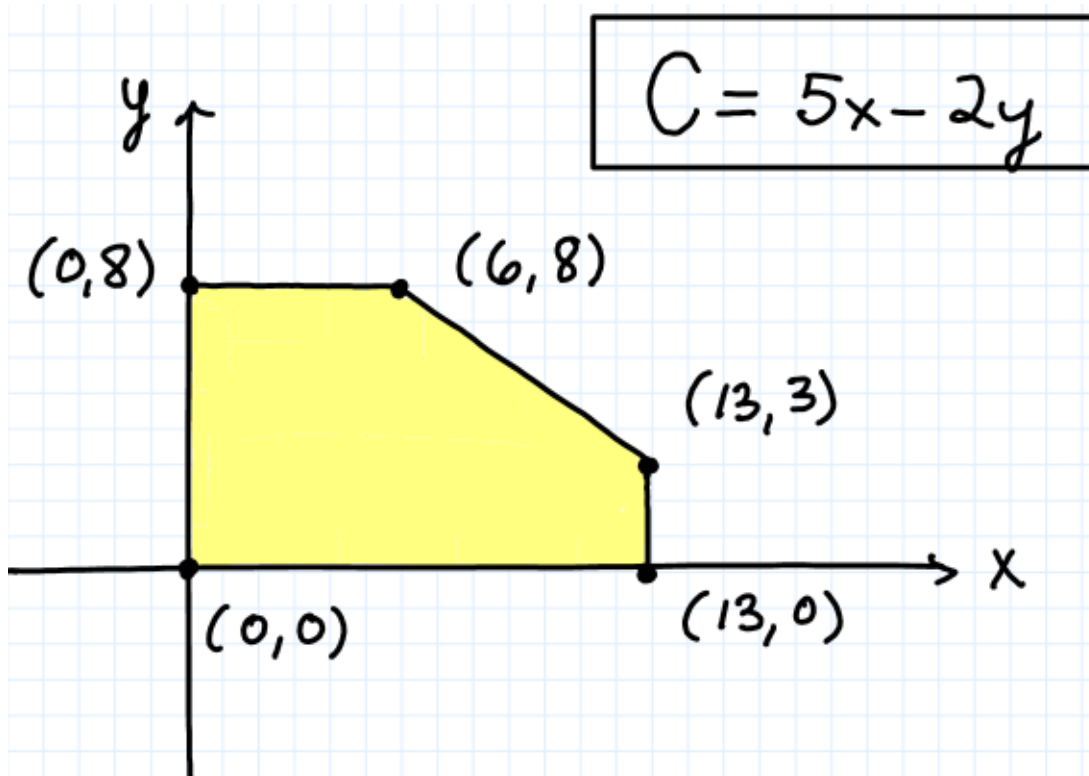
Find the minimum and maximum values of the objective quantity C:

1. Constraints
    $x + y \leq 6$
    $x - y \leq 4 \qquad C = 5x + 3y$
    $x \geq 0$
    $y \geq 0$

Overview of problems

2. Constraints

$2x + y \leq 3$

$3x + 4y \leq 12$ $\qquad C = 3x + y$

$x \geq 0$

$y \geq 0$

🚩 *Example Set: B*

solve:

1. AMX, Inc. produces two models of chain saws at two different plants. The Dallas, TX plant's production output is 140 of the basic and 35 of the promodel per day. The other plant in Newark, NJ has the capacity to produce 60 of the basic and 90 of the pro-models per day. AMX, Inc. has received an order to produce at least 460 of the basic and 340 of the pro-models. Find the minimum production cost to fulfill the order. The Dallas plant costs $1200 per day the Newark plant costs $900 per day.

🚩 *Example Set: C*

solve:

1. A store owner plans to sell the new iPod and zune mp3 players. The new Apple iPod sells for $350 and the zune goes for $400. When comparing the two mp3 players the store owner calculated that he can make an $85 profit off each iPod and a $90 profit from each zune. His experience suggests that he will not sell more than 150 total mp3 players for the month. Also, he has to keep his mp3 inventory budget of $56,000 or less for the month. How many iPods and zunes should the store owner stock in order to maximize his profit?

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🚩 *Example Set: D*

solve:

1. You have been hired to manage a tire production plant. You will oversee two production processes. Each process involves the use of machines, operators and electricians. Under the current labor contract you can have the electricians work for a total of 8400 hours. The operators that run the machine can work up to 4800 hours therefore limiting your machine operating time to 4800 hours. Use the chart below to help you figure out how many tires from each process you should make to maximize your profit.

Hours to make 1 tire	Process A	Process B
Electricians	6	6
Operators	2	4
Machine Time	4	2
Profit per Tire	$40	$50

🚩 *Example Set: E*

solve:

1. Jerry's Removal Service has signed a contract to haul 360 tons of dirt per day from a building site. Jerry will need his 9 drivers and fleet of 7 six-ton trucks and 4 ten-ton trucks to handle the job. The six-ton truck can make 8 trips a day while the ten-ton truck can make 6 trips per day. A six-ton truck costs $15/day and a ten-ton truck costs $24/day. How many of each type of truck should be used to minimize his costs?
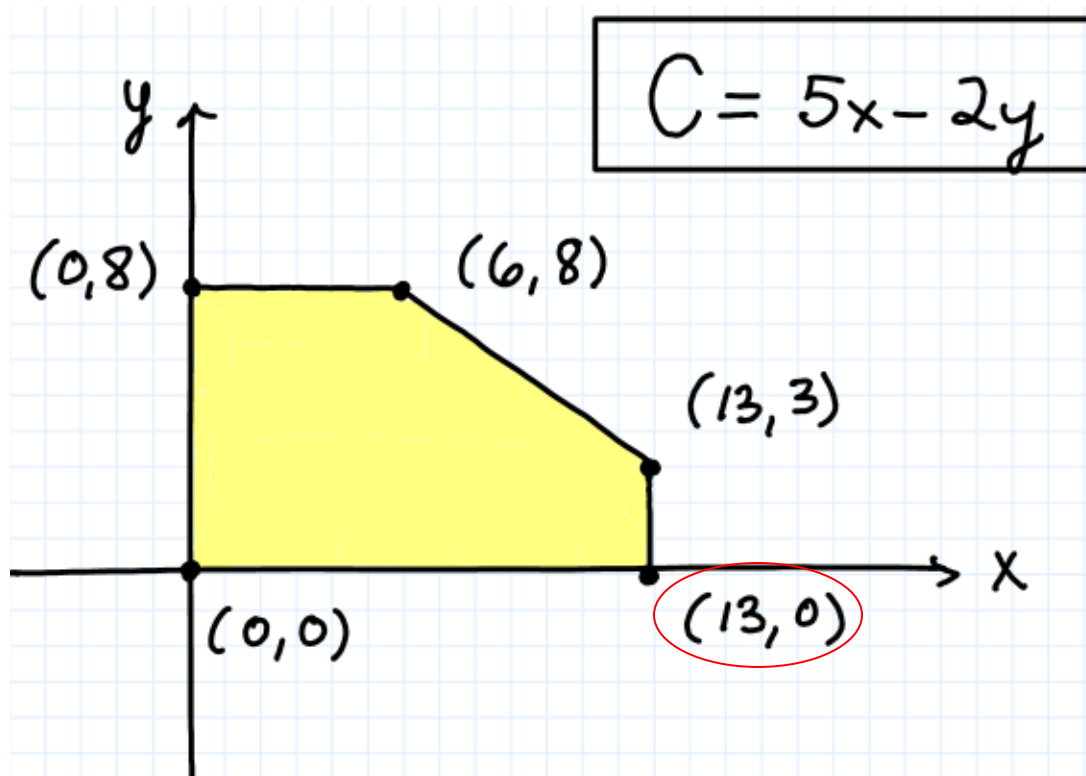
Linear Programming 3.7

Overview of problems

🚩 *Example Set: A -**ANSWER KEY***

Use the graph to find the maximum value of the objective function:

1.

$$C = 5x - 2y$$

(0,8)

(6,8)

(13,3)

(0,0)

(13,0)

(13,0) C=65 max. value

Linear Programming 3.7

Overview of problems

Find the minimum and maximum values of the objective quantity C:

2. Constraints

$x + y \leq 6$ (5,1) C=28 max. value
$x - y \leq 4$ $C = 5x + 3y$
$x \geq 0$
$y \geq 0$

3. Constraints

$2x + y \leq 3$ $(\frac{3}{2},0)$ C=4.5 max value
$3x + 4y \leq 12$ $C = 3x + y$
$x \geq 0$
$y \geq 0$

🚩 *Example Set: B- **ANSWER KEY***

solve:

AMX, Inc. produces two models of chain saws at two different plants. The Dallas, TX plant's production output is 140 of the basic and 35 of the promodel per day. The other plant in Newark, NJ has the capacity to produce 60 of the basic and 90 of the pro-models per day. AMX, Inc. has received an order to produce at least 460 of the basic and 340 of the pro-models. Find the minimum production cost to fulfill the order. The Dallas plant costs $1200 per day the Newark plant costs $900 per day.

$5100

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Overview of problems

🚩   *Example Set: C-ANSWER KEY*

solve:

1. A store owner plans to sell the new iPod and zune mp3 players. The new Apple iPod sells for $350 and the zune goes for $400. When comparing the two mp3 players the store owner calculated that he can make an $85 profit off each iPod and a $90 profit from each zune. His experience suggests that he will not sell more than 150 total mp3 players for the month. Also, he has to keep his mp3 inventory budget of $56,000 or less for the month. How many iPods and zunes should the store owner stock in order to maximize his profit?

<div align="center" style="color:red">

70 – Zunes
80 – iPods

</div>

🚩   *Example Set: D-ANSWER KEY*

solve:

1. You have been hired to manage a tire production plant. You will oversee two production processes. Each process involves the use of machines, operators and electricians. Under the current labor contract you can have the electricians work for a total of 8400 hours. The operators that run the machine can work up to 4800 hours therefore limiting your machine operating time to 4800 hours. Use the chart below to help you figure out how many tires from each process you should make to maximize your profit.

Hours to make 1 tire	Process A	Process B
Electricians	6	6
Operators	2	4
Machine Time	4	2
Profit per Tire	$40	$50

<div align="center" style="color:red">

400 tires from process A
1000 tires from process B

</div>

Overview of problems

🚩 *Example Set: E- **ANSWER KEY***

solve:

1. Jerry's Removal Service has signed a contract to haul 360 tons of dirt per day from a building site. Jerry will need his 9 drivers and fleet of 7 six-ton trucks and 4 ten-ton trucks to handle the job. The six-ton truck can make 8 trips a day while the ten-ton truck can make 6 trips per day. A six-ton truck costs $15/day and a ten-ton truck costs $24/day. How many of each type of truck should be used to minimize his costs?

<div align="center">

7 – small trucks

2 – big trucks

</div>