

Linear Programming:

The method of linear programming is a procedure we use to optimize (max/min) an **objective** subject to **constraints**.

Here is the short version:

Step 1: Label the two quantities

Collect information (in a table)

Step 2: Give Constraints and Objective.

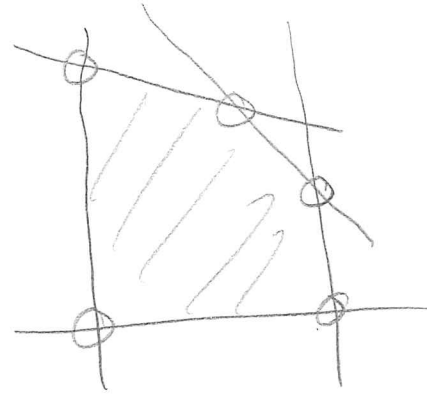
Step 3: Sketch the Feasible Region.

Step 4: Find the corners.

Step 5: Plug corners into the Objective.

Biggest output = max

Smallest output = min



PLUG THESE FIVE

POINTS INTO

THE OBJECTIVE

(THE THING WE WANT TO OPTIMIZE)

4.2: Linear Programming Examples

(From the lecture pack)

Your company makes two fruit juices.

Apple-Cranberry is 60% apple juice and 40% cranberry juice. **Cranberry-Apple** is 30% apple and 70% cranberry.

You make \$0.40 profit on each gallon of Apple-Cranberry and \$0.50 profit on each gallon of Cranberry-Apple. Your daily supply is limited to 12,000 gallons of pure apple juice and 11,000 gallons of pure cranberry juice.

Determine how much of each you should produce daily to maximize your profit.

STEP 1: "How much of each ..."

x = "gallons of Apple-Cranberry"
 y = "gallons of Cran-Apple"

Gallons =	x	y
APPLE JUICE	$0.6x$	$0.3y$
CRANBERRY JUICE	$0.4x$	$0.7y$
PROFIT	$0.4x$	$0.5y$

STEP 2: Constraints and Objective?

STEP 3: Graph

STEP 4: Corners

STEP 5: Evaluate objective

CONSTRAINTS

$$\textcircled{1} \text{ TOTAL APPLE JUICE } \leq 12000 \Rightarrow 0.6x + 0.3y \leq 12000$$

$$\textcircled{2} \text{ TOTAL CRAN. JUICE } \leq 11000 \Rightarrow 0.4x + 0.7y \leq 11000$$

$$\text{AND } \textcircled{3} x \geq 0 \quad \text{AND } \textcircled{4} y \geq 0$$

OBJECTIVE

$$\text{PROFIT} = P(x, y) = 0.4x + 0.5y$$

STEP 3

GRAPH CONSTRAINTS: $\textcircled{1} 0.6x + 0.3y = 12000$

$$\textcircled{2} 0.4x + 0.7y = 11000$$

$$\begin{aligned} x=0 &\Rightarrow y = \frac{12000}{0.3} = 40000 \\ y=0 &\Rightarrow x = \frac{11000}{0.7} \approx 15714.29 \\ x=0 &\Rightarrow y = \frac{11000}{0.7} \approx 15714.29 \\ y=0 &\Rightarrow x = \frac{11000}{0.4} = 27500 \end{aligned}$$

TEST (gd) ✓ SHADE

STEP 4

CORNERS \Rightarrow INTERSECTION

$$\textcircled{1} 0.6x + 0.3y = 12000$$

$$\textcircled{2} 0.4x + 0.7y = 11000$$

$$\begin{aligned} \textcircled{1} &\Rightarrow 0.3y = 12000 - 0.6x \quad \div 0.3 \\ &y = 40000 - 2x \end{aligned}$$

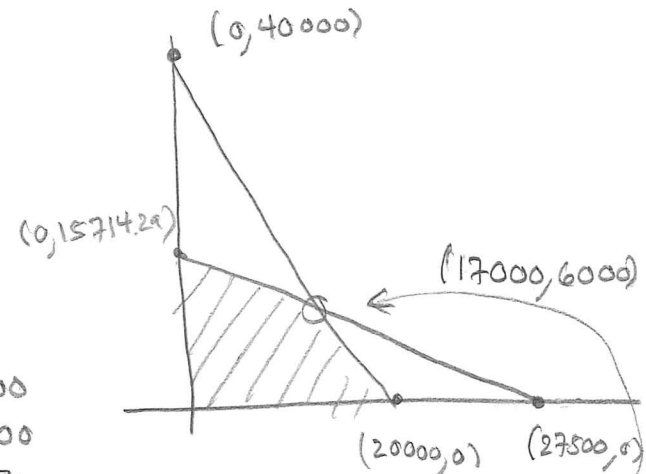
COMBINE $\textcircled{1}$ & $\textcircled{2}$ $0.4x + 0.7(40000 - 2x) = 11000$

$$0.4x + 28000 - 1.4x = 11000$$

$$-1x = -17000$$

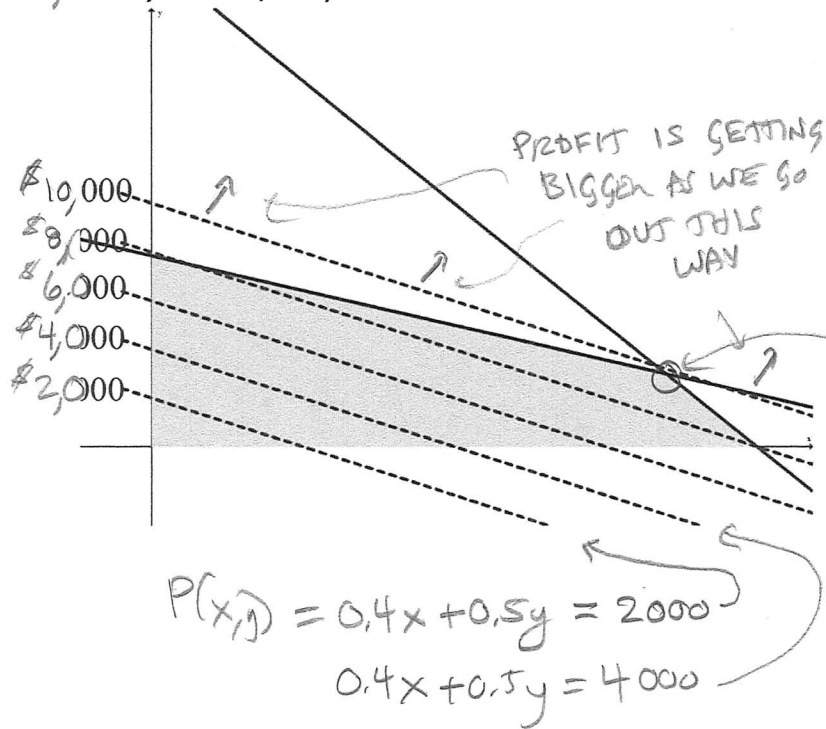
$$x = 17000$$

$$y = 40000 - 2(17000) = 6000$$



The feasible region for the juice example

Dotted lines corresponding to all points where profit is \$2,000, \$4,000, \$6,000, \$8,000, and \$10,000 are drawn.



MAX PROFIT OCCURS HERE

CORNERS

OBJECTIVE

$$\text{PROFIT} = 0.4x + 0.5y = P(x,y)$$

$$(0,0) \rightarrow P(0,0) = 0.4(0) + 0.5(0) = \$0$$

$$(20000,0) \rightarrow P(20000,0) = 0.4(20000) + 0.5(0) = \$8000$$

$$(0,15714.29) \rightarrow P(0,15714.29) = 0.4(0) + 0.5(15714.29) = \$7857.14$$

$$(17000,6000) \rightarrow P(17000,6000) = 0.4(17000) + 0.5(6000) = \$9800$$

$$\text{MAX PROFIT} = \boxed{\$9800}$$

IT OCCURS WHEN YOU PRODUCE 17000 gallons of Apple-Cran and 6000 gallons of Cran-Apple.

2. Gina inherits a large sum of money and a bunch of pet cages from an aunt.

She decides to rescue some unwanted pets from a shelter.

She has 20 cages that can each house either a bunny or a ferret.

On average it costs \$0.60 a day to feed one ferret and \$0.80 a day to feed one bunny. Gina can budget no more than \$14.40 a day for pet food. But cuddliness is an issue for Gina. She figures that bunnies are twice as cuddly as ferrets. That is, ferrets are each worth one cuddle-unit, while bunnies are each worth two.

Determine how many of each pet Gina could adopt to maximize cuddliness while staying within her budget and without buying more cages.

STEP 1: "...how many of each pet..."

x = "number of ferrets"

y = "number of bunnies"

Total pets =	x	y
COSTS =	$0.6x$	$0.8y$
CUDDLY =	$1 \cdot x$	$2 \cdot y$

$\rightarrow x + y \leq 20$

$\rightarrow 0.6x + 0.8y \leq 14.40$

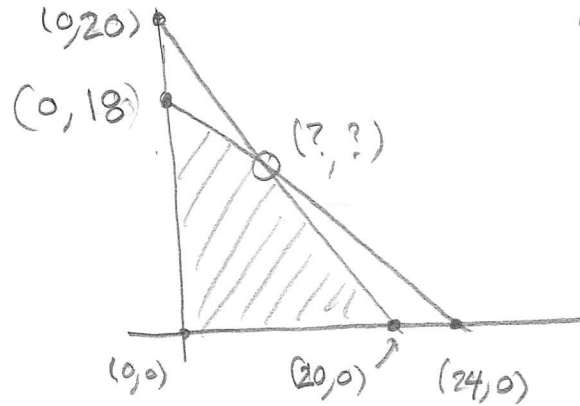
\rightarrow OBJECTIVE

STEP 2: Constraints and Objective?

$C(x,y) = x + 2y$

STEP 3: Graph

STEP 4: Corners



$x + y = 20 \rightarrow (20,0) \quad \frac{14.40}{0.8}$

$0.6x + 0.8y = 14.40 \rightarrow (0,18) \quad \frac{14.40}{0.6}$

INTERSECTIONS?

① $x + y = 20 \Rightarrow y = 20 - x$

② & ①

$0.6x + 0.8(20 - x) = 14.40$

$0.6x + 16 - 0.8x = 14.40$

$-0.2x = -1.6$

$x = 8$

$y = 20 - 8 = 12$

STEP 5: Evaluate objective

$(0, 0) \rightarrow C(0,0) = (0) + 2(0) = 0$

$(20, 0) \rightarrow C(20,0) = (20) + 2(0) = 20$

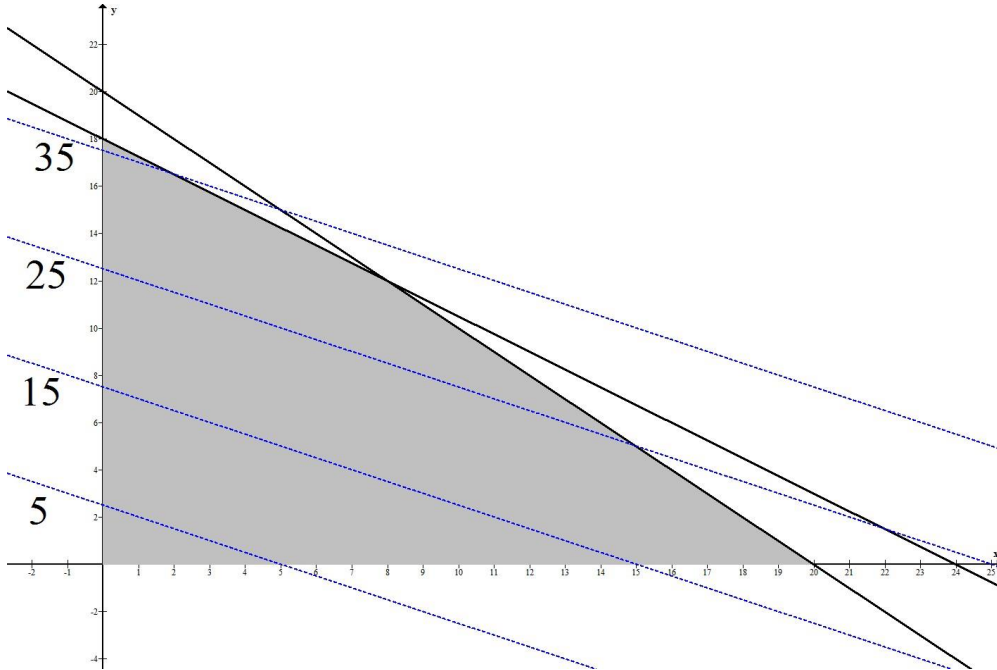
$(0, 18) \rightarrow C(0,18) = (0) + 2(18) = 36$

$(8, 12) \rightarrow C(8,12) = (8) + 2(12) = 32$

MAX CUDDLINESS = 36 WHICH OCCURS WHEN GINA GETS 0 FERRETS AND 18 BUNNIES.

The feasible region (Gina's pets)

Dotted lines correspond to all points where cuddliness is 5, 15, 25, and 35.



3. (From Homework) Two foods contain only proteins, carbohydrates, and fats.

Food A costs \$1 per pound and contains 30% protein and 50% carbohydrates.

Food B costs \$1.50 per pound and contains 20% protein and 75% carbohydrates.

What combination of these two foods provides at least 1 pound of protein, 2.5 pounds of carbohydrates, and 0.25 pounds of fat at the lowest cost?

STEP 1: "What ... these two foods..."

x = "pounds of Food A"

y = "pounds of Food B"

amount =	X	y
COSTS =	$1 \cdot x$	$1.50 \cdot y$
PROTEIN =	$0.3x$	$0.2y$
CARBS =	$0.5x$	$0.75y$
FAT =	$0.2x$	$0.05y$

$$0.3x + 0.2y \geq 1$$

$$0.5x + 0.75y \geq 2.5$$

$$0.2x + 0.05y \geq 0.25$$

TEST
 (0,0)
 DOES NOT
 WORK IN THESE
 SHADE
 OTHER SIDE!

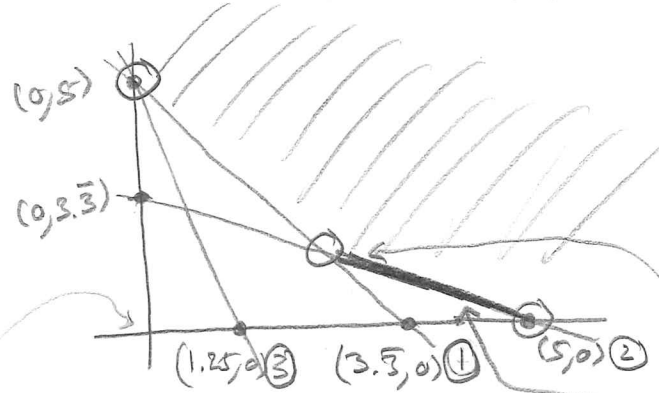
STEP 2: Constraints and Objective?

STEP 3: Graph

STEP 4: Corners

$$\text{OBJECTIVE: } C(x,y) = x + 1.5y$$

- ① $0.3x + 0.2y = 1 \rightarrow (0,5), (3.\bar{3},0)$
- ② $0.5x + 0.75y = 2.5 \rightarrow (0,3.\bar{3}), (5,0)$
- ③ $0.2x + 0.05y = 0.25 \rightarrow (0,5), (1.25,0)$



STEP 5: Evaluate objective

- $(5,0) \rightarrow C(5,0) = (5) + 1.5(0) = \5
- $(2,2) \rightarrow C(2,2) = (2) + 1.5(2) = \5
- $(0,5) \rightarrow C(0,5) = (0) + 1.5(5) = \7.5

LOWEST COST = \$5

IT OCCURS WHEN
 $x = 2$ & $y = 2$
 OR
 $x = 5$ & $y = 0$

(ON ANYWHERE ON THIS EDGE)

CORNERS?

$$\textcircled{1} 0.3x + 0.2y = 1$$

$$\textcircled{2} 0.5x + 0.75y = 2.5$$

$$\textcircled{1} 0.2y = 1 - 0.3x$$

$$y = 5 - 1.5x$$

① & ②

$$0.5x + 0.75(5 - 1.5x) = 2.5$$

$$0.5x + 3.75 - 1.125x = 2.5$$

$$-0.625x = -1.25$$

$$x = 2$$

$$y = 5 - 1.5(2) = 2$$

$$(2,2)$$

4. Your company makes two household cleaners: Miracle Bathtub Cleaner and Speedex Floor Cleaner. Your daily production of both cleaners combined is limited to 2,000 gallons. Your daily sales of Miracle Bathtub Cleaner never exceed 1,200 gallons, and your daily sales of Speedex Floor Cleaner never exceed 1,400 gallons. Finally, you make \$1.00 profit on each gallon of Miracle Bathtub cleaner that you sell and \$2.00 on each gallon of Speedex Floor Cleaner that you sell.

Determine the amount of each cleaner you should produce in order to maximize profit.

STEP 1: "...amount of each cleaner..."

x = "gallons of Mir. Bathtub Cleaner"

y = "gallons of Speedex Floor Cleaner"

TOTAL GALLONS =	x	y
PROFIT =	$1 \cdot x$	$2 \cdot y$

⇒ OBJECTIVE

$$P(x,y) = x + 2y$$

STEP 2: Constraints and Objective?

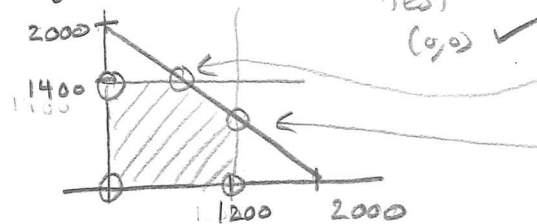
STEP 3: Graph

STEP 4: Corners

$$\textcircled{1} \quad x + y \leq 2000 \quad \leftarrow (0, 2000) \quad (2000, 0)$$

$$\textcircled{2} \quad x \leq 1200 \quad (1200, 0) \quad (1200, 1000)$$

$$\textcircled{3} \quad y \leq 1400 \quad (0, 1400) \quad (1000, 1400)$$



$$\begin{aligned} \textcircled{1} \quad x + y &= 2000 \\ \textcircled{3} \quad y &= 1400 \\ \Rightarrow x &= 600 \end{aligned}$$

$$\begin{aligned} \textcircled{1} \quad x + y &= 2000 \\ \textcircled{2} \quad x &= 1200 \\ \Rightarrow y &= 800 \end{aligned}$$

STEP 5: Evaluate objective

$$(0, 0) \rightarrow P(0,0) = (0) + 2(0) = 0$$

$$(0, 1400) \rightarrow P(0,1400) = (0) + 2(1400) = 2800$$

$$(1200, 0) \rightarrow P(1200,0) = (1200) + 2(0) = 1200$$

$$(600, 1400) \rightarrow P(600,1400) = (600) + 2(1400) = 3400 \leftarrow \text{MAX!}$$

$$(1200, 800) \rightarrow P(1200,800) = (1200) + 2(800) = 2800$$

MAX PROFIT = \$3400 AND IT OCCURS

WHEN YOU PRODUCE $x = 600$ gallons of miracle Bathtub Cleaner

AND $y = 1400$ gallons of Speedex Floor Cleaner

Preview of how we will set up the problems in 4.2

Example 1: (From Homework)

Newjet, Inc. manufactures inkjet printers and laser printers. The company has the capacity to make 490 printers per day, and it has 840 hours of labor per day available. It takes 1 hour to make an inkjet printer and 3 hours to make a laser printer. The profits are \$90 per inkjet printer and \$140 per laser printer. Find the maximum profit.

Answer Set up (how we start):

x = number of inkjet, y = number of laser

	x	y
Hours per item	1	3
Profits per item	90	140

Totals: Total hours = $x + 3y$, Total profits = $90x + 140y$, Total number of printers = $x + y$.

Constraints: Total number of printers ≤ 490 , so $x + y \leq 490$.

Total number of hours ≤ 840 , so $x + 3y \leq 840$.

Objective: Total profits = $P(x, y) = 90x + 140y$.

Example 2: (From Homework)

A company manufactures two types of electric hedge trimmers, one of which is cordless. The cord-type trimmer requires 4 hours to make, and the cordless model requires 10 hours. The company has only 2000 work hours to use in manufacturing each day, and the packaging department can package only 300 trimmers per day.

Answer Set up (how we start):

x = # of cord-type, y = # of cordless

	x	y
Hours per item	4	10

Totals: Total hours = $4x + 10y$, Total number of trimmers = $x + y$.

Constraints: Total number of trimmers ≤ 300 , so $x + y \leq 300$.

Total number of hours ≤ 2000 , so $4x + 10y \leq 2000$.

Objective: None Given.

Example 3: (From an old exam)

Your company makes two kinds of soda: Regular and Diet. Your total daily production of soda is limited to 1000 gallons. Production requires 2 cup of sugar per gallon of Regular and 1/2 cup of sugar per gallon of Diet. Today, you are limited to 626 cups of sugar. The profit is \$1 per gallon of Regular soda and \$1.20 per gallon of Diet soda

Answer Set up (how we start):

x = gallons of Regular, y = gallons of Diet

	x	y
Sugar per item	2	0.5
Profit per item	1	1.20

Totals: Total sugar = $2x + 0.5y$, Total profits = $x + 1.20y$, Total gallons = $x + y$.

Constraints: Total sugar ≤ 626 , so $2x + 0.5y \leq 626$.

Total gallons ≤ 1000 , so $x + y \leq 1000$.

Objective: Total Profits = $P(x, y) = x + 1.20y$

Example 4 (From an old exam):

Oscar sells boxes of toys and balloons for children's parties. The Standard Box contains 30 toys and 60 balloons. The DeLuxe Box contains 75 toys and 90 balloons. Oscar has just done a complete check of his inventory and has found that he has 20,250 toys and 30,900 balloons currently in stock. He earns a profit of \$7 for each Standard Box and \$8 for each DeLuxe Box. How many of each Box Oscar should sell in order to maximize profit?

Answer Set up (how we start):

x = boxes of Standard, y = boxes of DeLuxe

	x	y
Toys per item	30	75
Balloons per item	60	90
Profit per item	7	8

Totals: Toys = $30x + 75y$, Balloons = $60x + 90y$, Profits = $7x + 8y$.

Constraints: Toys ≤ 20250 , so $30x + 75y \leq 20250$.

Balloons ≤ 30900 , so $60x + 90y \leq 30900$.

Objective: Total Profits = $P(x, y) = 7x + 8y$

Sections 4.2 Review

The method of **linear programming** is a procedure we will use to optimize (max/min) an *objective* subject to *constraints*. Here is the short version:

- **Step 1: Label the two quantities.**

Example: “How many pounds of each ... ” would mean x = amount of first (in pounds), y = amount of second (in pounds)

- **Step 2: Collect information from the problem.** Make a table of rates for x and y , write out formulas for total amounts, and list any restrictions.

- **Step 3: Give Constraints and Objective.** Write down the inequalities for the constraints and write down the function for the objective. Note that the last sentence typically tells you the objective. For example, “...to minimize cost?” means that the cost function, $C(x, y)$, is the objective you are minimizing. You will only use the objective at the end of the problem.

- **Step 4: Sketch the Feasible Region.** Draw the line and shade the region that corresponds to each of the constraint inequalities. Indicate the overlapping region (this is the feasible region).

- **Step 5: Find all the corners for the overlapping Feasible Region.** You probably will need to do some intersections to do this. Use your picture to figure out which lines you need to intersect.

- **Step 6: Plug each corner into the objective.** The largest output is the maximum and the smallest output is the minimum.

We did four big examples in lecture. Here are a three more for you to try (full answers are on the following pages):

Lawn Care Example: A lawn care company has two types of fertilizer Regular and Deluxe. The profit for Regular is \$0.75 per bag and the profit for Deluxe is \$1.20 per bag. One bag of Regular has 3 pounds of active ingredient and 7 pounds of inert ingredients. One bag of Deluxe has 4 pounds of active ingredients and 6 pounds of inert ingredients. The warehouse has a limit of 8400 pounds of active ingredient and 14100 pounds on inert ingredient.

How many bags of each should we make to maximize profit?

A Boring No Words Question: Find the maximum of the objective $f(x, y) = 14x + 20y$ subject to the constraints: $4x + 6y \leq 1800$, $x \leq 300$, $y \leq 150$, $x \geq 0$, and $y \geq 0$.

Cookie Company Example: Your company makes two types of chocolate chip cookies. Each bag of ‘Chocolate Lite’ contains 10 ounces of chocolate chips and 35 ounces of dough. Each bag of ‘Chocolate Overload’ contains 20 ounces of chocolate chips and 25 ounces of dough. The profit on each bag of Chocolate Lite is \$1.10, while the profit on each bag of Chocolate Overload is \$0.80. Your company current has 1000 ounces of chocolate chips and 2555 ounces of cookie dough.

How many bags of each should you produce to maximize profit?

ANSWER to Lawn Care Example:

Let x = number of bags of Regular and y = number of bags of Deluxe. Here is the collected information:

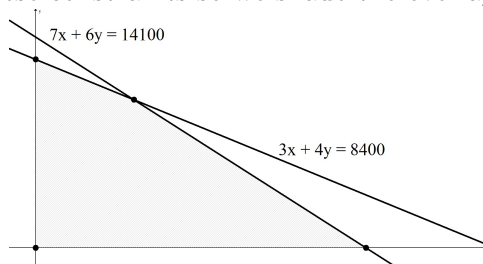
	x	y	Total formula	Constraints/Objective
Active	3	4	$3x + 4y$	$3x + 4y \leq 8400$
Inert	7	6	$7x + 6y$	$7x + 6y \leq 14100$
Profit	0.75	1.20	$0.75x + 1.20y$	$P(x, y) = 0.75x + 1.20y = \text{Objective}$

Now we get points, draw the lines and shade the feasible region:

$3x + 4y = 8400$ goes through $(0, \frac{8400}{4}) = (0, 2100)$ and $(\frac{8000}{3}, 0) = (2800, 0)$.

$7x + 6y = 14100$ goes through $(0, \frac{14100}{6}) = (0, 2330)$ and $(\frac{141000}{7}, 0) \approx (2014.29, 0)$.

Note that $(0, 0)$ works in both of these constraints so we shade the overlapping 'origin-side' of the lines.



To get the corner at the intersection, we combine: (i) $3x + 4y = 8400$ and (ii) $7x + 6y = 14100$

$$(i) \quad 3x + 4y = 8400 \Rightarrow 4y = 8400 - 3x \Rightarrow y = 2100 - 0.75x.$$

$$(i) \text{ and } (ii) \quad 7x + 6(2100 - 0.75x) = 14100 \Rightarrow 7x + 12600 - 4.5x = 14100 \Rightarrow 2.5x = 1500 \Rightarrow x = \frac{1500}{2.5} \approx 600.$$

$$\text{And } y = 2100 - 0.75x = 2100 - 0.75(600) = 1650$$

Evaluating the objective at the found corners gives:

$$P(0, 0) = 0.75(0) + 1.20(0) = 0 \text{ dollars}$$

$$P(0, 2100) = 0.75(0) + 1.20(2100) = 2520 \text{ dollars}$$

$$P(2014.29, 0) = 0.75(2014.29) + 1.20(0) = 1510.71 \text{ dollars}$$

$$P(600, 1650) = 0.75(600) + 1.20(1650) = 2430 \text{ dollars}$$

Thus, the maximum profit is \$2520 and it occurs when you produce $x = 0$ bags of Regular and $y = 2100$ bags of Deluxe.

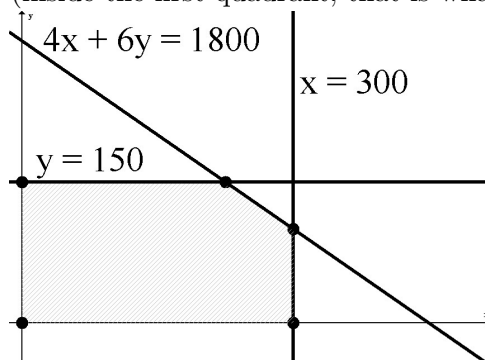
ANSWER to A Boring No Words Question:

The problem is already set up for us, so we just need to graph and find corners. First get points, draw the lines and shade the feasible region:

$4x + 6y = 1800$ goes through $(0, \frac{1800}{6}) = (0, 300)$ and $(\frac{1800}{4}, 0) = (450, 0)$.

$y = 150$ is a horizontal lines at $y = 150$.

$x = 300$ is a vertical line at $x = 300$. Note that $(0,0)$ works in these three constraints so we shade the overlapping 'origin-side' of the lines (inside the first quadrant, that is what $x \geq 0$ and $y \geq 0$ is telling us).



To get the corners at the intersections, we combine.

One corner: (i) $4x + 6y = 1800$ and (ii) $y = 150$

(i) and (ii) $4x + 6(150) = 1800 \Rightarrow 4x + 900 = 1800 \Rightarrow 4x = 900 \Rightarrow x = \frac{900}{4} \approx 225$. So one of the corners is $(225, 150)$.

The other corner: (i) $4x + 6y = 1800$ and (ii) $x = 300$

(i) and (ii) $4(300) + 6y = 1800 \Rightarrow 1200 + 6y = 1800 \Rightarrow 6y = 600 \Rightarrow y = \frac{600}{6} \approx 100$. So the other corner is $(300, 100)$.

Evaluating the objective at the found corners gives:

$$\begin{aligned} f(0, 0) &= 14(0) + 20(0) &= 0 \\ f(0, 150) &= 14(0) + 20(150) &= 3000 \\ f(300, 0) &= 14(300) + 20(0) &= 4200 \\ f(300, 100) &= 14(300) + 20(100) &= 6200 \\ f(225, 150) &= 14(225) + 20(150) &= 6150 \end{aligned}$$

Thus, the maximum is 6200 and it occurs when $x = 300$ and $y = 100$.

ANSWER to Cookie Company Example:

Let x = number of bags of Chocolate Lite and y = number of bags of Chocolate Overload. Here is the collected information:

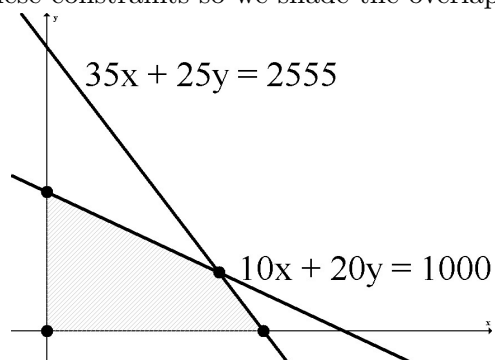
	x	y	Total formula	Constraints/Objective
Chips	10	20	$10x + 20y$	$10x + 20y \leq 1000$
Dough	35	25	$35x + 25y$	$35x + 25y \leq 2555$
Profit	1.10	0.80	$1.10x + 0.80y$	$P(x, y) = 1.10x + 0.80y = \text{Objective}$

Now we get points, draw the lines and shade the feasible region:

$10x + 20y = 1000$ goes through $(0, \frac{1000}{20}) = (0, 50)$ and $(\frac{1000}{10}, 0) = (100, 0)$.

$35x + 25y = 2555$ goes through $(0, \frac{2555}{25}) = (0, 102.2)$ and $(\frac{2555}{35}, 0) \approx (73, 0)$.

Note that $(0, 0)$ works in both of these constraints so we shade the overlapping 'origin-side' of the lines.



To get the corner at the intersection, we combine: (i) $10x + 20y = 1000$ and (ii) $35x + 25y = 2555$

$$(i) \quad 10x + 20y = 1000 \Rightarrow 20y = 1000 - 10x \Rightarrow y = 50 - 0.5x.$$

$$(i) \text{ and } (ii) \quad 35x + 25(50 - 0.5x) = 2555 \Rightarrow 35x + 1250 - 12.5x = 2555 \Rightarrow 22.5x = 1305 \Rightarrow x = \frac{1305}{22.5} \approx 58.$$

$$\text{And } y = 50 - 0.5x = 50 - 0.5(58) = 21.$$

Evaluating the objective at the found corners gives:

$$P(0, 0) = 1.10(0) + 0.80(0) = 0 \text{ dollars}$$

$$P(0, 50) = 1.10(0) + 0.80(50) = 40 \text{ dollars}$$

$$P(73, 0) = 1.10(73) + 0.80(0) = 80.30 \text{ dollars}$$

$$P(58, 21) = 1.10(58) + 0.80(21) = 80.60 \text{ dollars}$$

Thus, the maximum profit is \$80.60 and it occurs when you produce $x = 58$ bags of Chocolate Lite and $y = 21$ bags of Chocolate Overload.

Section 4.1 / Problem 4: Example of Graphing Inequalities in WebAssign Graphing Tool

Section 4.1 / Problem 4: Graph the region given by the set of inequalities

- (1) $x + 2y \leq 48$; (2) $x + y \leq 30$;
(3) $2x + y \leq 50$; (4) $x \geq 0$; (5) $y \geq 0$

STEP 1: Graph a line for EVERY inequality. In this example you will graph 5 lines. You need to find a couple points on each line that are in the graphing window. We will discuss in lecture how you can quickly find these....

$x+2y = 48$ goes thru (0,24) and (48,0); $x + y = 30$ goes thru (0,30) and (30,0);

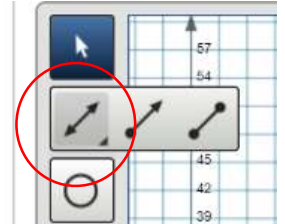
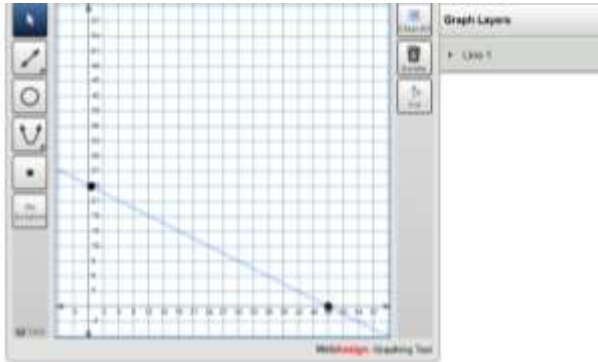
$2x + y = 50$ goes thru (0,50) and (25,0); $x = 0$ goes thru (0,0) and (0,10). $y = 0$ goes thru (0,0) and (5,0).

Plot each line with 3 clicks as follows:

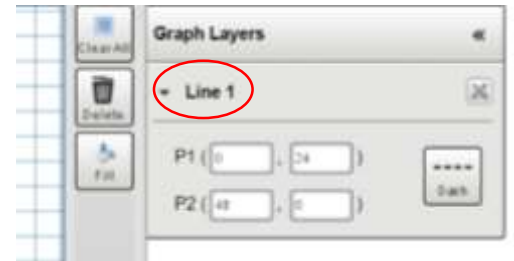
(a) 1 Click - Click on the double-arrow line (do not click "ray" or "line segment").

(b) 2 More Clicks - Click on the two points.

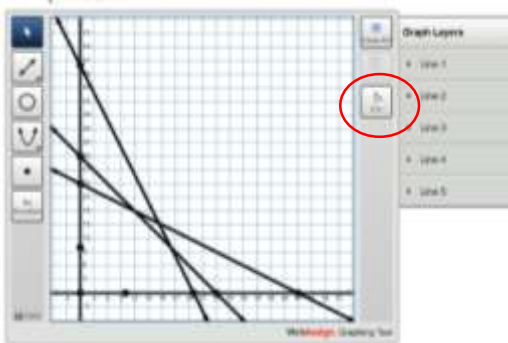
Here I clicked on (0,24) and (48,0) and the line appeared...



NOTE: If you click on the link that says "Line 1" you can see and adjust the points you clicked, it looks like this... (please check this for each line)



Here is what it looks like after I plotted all 5 lines...



STEP 2: Click "Fill" (shown circled above) and click any point in the region that satisfies all the inequalities.

In this case (1,1) works in all the inequalities you click any point the region containing (1,0). Here is the answer with a "Green Check" for correct, success!

