

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 = $P(x, y) = 7x + 8y$

IMPORTANT HOMEWORK HINTS FOR NEXT WEEK: Section 1.5 and 4.1 should be very quick. But let me make a few comments based on questions from last year.

Hints for Section 1.5 Homework: Last year, I got two recurring questions about 1.5. Here are some comments pertaining to these issues:

- A) **Please don't use the "watch it" in section 1.5.** Last year I had several dozen students asking me to explain the various methods that Webassign showed to solve the problem. In many of the problems the "watch it" uses ways to solve the systems that are way too complicated. Instead do as I will show you in class. For most problems in this class, the easiest way to solve a system is to use substitution (easiest in the sense that, it requires no cleverness). That is, solve for one variable in one of the equations and substitute into the other equation. This will ALWAYS work! So you don't need other methods. If you happen to know how to do other methods that is fine too, but if you can do substitution comfortably, then go ahead and use it. You can see two examples on the posted 1.5 review sheet.
- B) **SECTION 1.5 / PROBLEM 6:** The wording is a little different than the other problems, so let me clarify. You need to compute the total mixed bag cost before you start the problem. If the price is \$3.40 per pound for the mixed bag and it is a total of 70 pounds, then the total money is $3.40 \times 70 = \$238$. You are then going to set up equations very much like you did in the other problems. Your set up will look something like: $x + y = 70$ and $2.6x + 5.4y = 238$. (Your numbers will be different than mine).

Hints for Section 4.1 Homework: This section seemed to go well for most students last year. Once I discuss this section in class, this should be quick to do. But there were a few technical issues last year so let me say a few things to prevent some headache:

- A) **Choose solid lines for all your lines** (no rays, no dotted lines, no segment... use only solid lines which are the ones that have arrows in both directions in the menu). And only plot the lines (don't plot points unless it asks you to).
- B) **Make sure to graph ALL the lines.** For example if you have
 $2x + 5y \leq 10$, $x + y \leq 6$, $x \geq 0$, $y \geq 0$
Then **you need to graph all four lines:**
(i) $2x + 5y = 10$, which is a line through $(0,2)$ and $(5,0)$.
(ii) $x + y = 6$, which is a line through $(0,6)$ and $(6,0)$.
(iii) $x = 0$, which is the y-axis (it goes through $(0,0)$ and $(0,1)$).
(iv) $y = 0$, which is the x-axis (it goes through $(0,0)$ and $(1,0)$).
- C) **Then shade the correct region.** In the example above, $(0,0)$ works in both $x + 5y \leq 10$ and $x + y \leq 6$. So make sure you are shading the overlapping region on the "origin" side of these lines. In the example above you would plot four solid lines, then click the region to shade and that is all you would do (plot nothing else!).
- D) **Make sure you don't get the x and y flipped!**
- E) **When you are finding an intersection, look at the graph!** If you are intersecting two lines, then you should be working with the equations for those two lines.
- F) **If you make a mistake (plotting incorrect lines or plotting extra points or doing anything you didn't need to do in the graph or if you get a red X), then click "Clear all".** And then redraw the correct lines.

VERY IMPORTANT: In brief, for the 4.1 problems you will do the following:

- i) Click on the Solid Extended Line button for all lines (NOT line segments, NOT points, NOT rays)
- ii) Type in the points for your line (in the boxes provided after you click on the line button)
- iii) Do this again for all your lines.
- iv) Shade the region. That is, click the shade button and click in the desired region.

Another Small Note: You have to plot points in the actual window you can see.

For the line $x + 50y = 200$, the x-intercept is $(200,0)$ which may be outside the window.

So pick another point (plug in $x = 100$ and find y and plot that point, or plug in $x = 50$ and find y and plot that point, etc...)