

Section 7.3

* \leq less or equal (at Most)
 * \geq Greater or equal (at least)

* $2x + 3y \leq 5$ Constraint
 Max Profit = $5x + 2y$ Objective
 Variable $x, y \geq 0$

Story Problems

* Two Products x & y

	Product		- Supply, - Required, - Available
	x	y	
- Ingredient			
- Components			
- Units			
Price \$			Max, Min

Example A

Raisins (x), Peanuts (y)

	x	y	
Carbs	0.8	0.2	≥ 90
Calories	3	6	≥ 600
Cost	4¢	5¢	Min

$$0.8x + 0.2y \geq 90$$

$$3x + 6y \geq 600$$

$$\text{Min } C = 4x + 5y \quad (x, y \geq 0)$$

Example B

	Deluxe x	Special y	
Almonds	1	1	≤ 100
Cashews	2	1	≤ 180
Peanuts	1	3	≤ 240
Profit	2.5	1.5	Max

$$x + y \leq 100$$

$$2x + y \leq 180$$

$$x + 3y \leq 240$$

$$\text{Max } 2.5x + 1.5y$$

Example C

	First X	Second Y	
oats	0.8	0.6	≤ 100
Almond	0.01	0.03	≤ 10
dried App	\emptyset	0.04	≤ 5
Sunflower	0.12	0.24	≤ 25
Nuts	0.07	0.09	≤ 15
Income	\$0.95	\$1.35	

$$\begin{aligned}
 0.8X + 0.6Y &\leq 100 \\
 0.01X + 0.03Y &\leq 10 \\
 0X + 0.04Y &\leq 5 \\
 0.12X + 0.24Y &\leq 25 \\
 0.07X + 0.09Y &\leq 15 \\
 \text{Max } &0.95X + 1.35Y
 \end{aligned}$$

Example D

	kent X	Worsted Y	
Cutting	2	4	≤ 20
Sewing	4	2	≤ 16
Profit	\$34	\$31	Max

$$\begin{aligned}
 2X + 4Y &\leq 20 \\
 4X + 2Y &\leq 16 \\
 \text{Max } P &= 34X + 31Y
 \end{aligned}$$

Graph \rightarrow

$$P = 34x + 31y$$

$$2x + 4y \leq 20$$

$$2x + 4y = 20$$

$$4y = 20 - 2x$$

$$y = \frac{20 - 2x}{4}$$

x	y
0	5
10	0

$$4x + 2y \leq 16$$

$$4x + 2y = 16$$

$$2y = 16 - 4x$$

$$y = \frac{16 - 4x}{2}$$

x	y
0	8
4	0

Example D
Solution

Corner Points : A(0,0) $\rightarrow P = 0 + 0 = 0$

B(0,5) $\rightarrow P = 34(0) + 31(5) = 155$

C(2,4) $\rightarrow P = 34(2) + 31(4) = 192$

D(4,0) $\rightarrow P = 34(4) + 31(0) = 136$

Max = \$192 when

$x = 2$
Rmit

$y = 4$
Worstel

