

Shannon

Interview your partner

- Name
- Why you're taking math / Future studies
- how you energize yourself
- one interesting thing about yourself

Break at 3:00 - 3:30 → no eating in class

Resources to succeed in math

• book  
• tutor  
Sally

• website  
• internet / google / Khan academy  
• pretests →  
• yourself      • friends / peer

optimal → the best

optimize → making better

- limits
- constraints

business

→ optimizing profit



→ raw material/supplies

→ optimizing costs



→ quality

→ taxes

→ weight

→ time

→ space/quantity

## Optimization

Unit 1: Interpreting optimization Problems

Unit 2: Translating word problem into math language

- ① Define variables / unknowns ?
- ② Construct Optimization Equation (Prof./Cost Equation)  
(elements required to define the function to be optimized)
- ③ Construct constraint inequalities  $\geq$   $\leq$   
(elements required to define the constraints of the problem)

pg 1.2 Grand Slam Rackets

frame T → 20 mins

stringing T → 20 mins

frame B → 15 mins

stringing B → 30 mins

frame store 240hr/week 14 400 mins

stringing store 300hr/week 18 000 mins

\$5 → T

\$6 → B

① Unknowns/Variables  
(what the question asks you to determine)  
?

$x$  : # of tennis rackets

$y$  : # of badminton rackets.

② Optimization Equation (Profit)  
(construct in your unknowns)  
(tip: do a case scenario)

$$P = 5x + 6y$$

③ Construct constraint inequalities  
(use the variables) into math  
(translate sentences) equations

(do a case scenario)

(make a balanced equation)

$$20 \cdot x + 15y \leq 14400$$

$$20 \cdot x + 30y \leq 18000$$

trivial constraints  $\left\{ \begin{array}{l} x \geq 0 \\ y \geq 0 \end{array} \right.$

P 1.5

① Unknowns / Variable ?

$x$  : # of 1 kg. bags

$y$  : # of 2 kg bags

optimize  $\hat{=}$  maximize

$\hat{=}$  minimize

kg per bag

# of bags

2.3

②  $Z = 0.9x + 1.50y$

③ Constraint inequalities.

$$\underbrace{1\text{kg} \cdot x}_{\# \text{ of kg}} + \underbrace{2\text{kg} \cdot y}_{\# \text{ of kg}} \leq 150 \text{ kg}$$

$x \geq 10$

$$x + 2y \leq 150$$

$y \geq x \rightarrow$  a greater # of 2kg bags than 1kg bags

$x \geq 10 \rightarrow$  at least or more

$$y \geq 15$$

$$x \geq 0$$

$$y \geq 0$$

Do Q 1, 2 on p 1.4 (answer word form)

same as 1, 2 on p 2.9/2.10 (answers in equation form)

pg 2.12 (they refer to unit 1)

5:15

⋮

you could read the book's explanation and tips.

The Ideal Kitchen Company hires 12 cabinetmakers and 4 cabinetmaker-trainees to manufacture different quality cupboards: a luxurious model and a standard model. The manufacturing of a luxurious cupboard needs 4 hours of work per cabinetmaker and 2 of work per trainee. The manufacturing of a standard cupboard needs 8 hours of work per cabinetmaker and 2 of work per trainee. The collective agreement specifies that an employee can't work more than 8 hours a day. If the employer realizes a \$20 profit per luxurious model and \$12 on a standard model, how many cupboards of each model will he need to manufacture per day to maximize his profit?

$$P = 20x + 12y$$

$$48x + 96y \leq 96 \text{ hrs}$$

$$8x + 8y \leq 32$$

$$x \geq 0$$

$$y \geq 0$$

$x = \#$  of luxurious models  
 $y = \#$  of standard models



The owner of an electronics store states that she cannot purchase more than 60 televisions of two different models for her store as she does not want to overstock items. At most, each 27" television occupies  $0.7 \text{ m}^3$  and each 32" model uses  $1.2 \text{ m}^3$ . She has a maximum storage space of  $50 \text{ m}^3$  in the warehouse. Since the 32" model sells better than the 27" model, she keeps at least 30 in inventory. She makes a profit of 150\$ per 27" and 250\$ per 32".

How many 27" televisions and how many 32" televisions should they sell if they want to maximize their profit?