MA162: Finite mathematics

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Schedule:

- Exams are available on mathclass.org.
- HW B1 is due Monday, Feb 22nd, 2010.
- HW B2 is due Monday, Mar 1st, 2010.
- HW B3 is due Sunday, Mar 7th, 2010.
- Exam 2 is Monday, Mar 8th, 5:00pm-7:00pm.
- My office hours are Tuesday and Thursday, 2:30pm-4:00pm in CB63

Today we will cover 3.2: setting up word problems

People did quite well on this quiz. I hope there are more opportunities for artisitic solutions.



#2:
•
$$x \ge 0$$
,
• $y \ge 0$, and
• $x + y \le 4$

3.2: Word problems

- Scarcity is a fact of life and a challenge
- There is an abundance of wonderful things in this life
- But there is also a disturbing **austerity**: We often lack the time, money, or space to enjoy them
- Allocating our limited resources is a very important life skill
- Today we learn to phrase resource allocation problems mathematically
- We must decide which of the wonderful things in life we will spend our limited time, money, or space on.
 "Do we invest in a life-size dinosaur for our room, or do we spend our time painting murals on the walls?"

3.2: What are decisions?

- One often hears that a happy person needs: the serenity to accept the things they cannot change, the courage to change the things they can, and the wisdom to know the difference.
- To be any kind of effective manager, indeed to live a full and happy life, you need to be able to identify the **variables** over which you have control
- Your decisions are precisely the decision as to what value you should give each variable.
- You cannot make your decisions willy-nilly: you must operate under certain constraints, For instance there are only 24 hours in a day, and you only have so much money.
- You do not make decisions for no reason; you have a goal, an **objective**

3.2: What are mathematical models of decisions?

- This math course gives you a framework to make decisions
- It is particularly effective at resource allocation and is responsible for making million dollar decisions every day
- Identify the variables, and communicate clearly what they are "x is the number of sedans I ask our factory's production line manager to produce, y is the number of coupes I ask for, z is the number of trucks I ask for. In other words, the variables are our production goals"
- Identify the constraints, as linear inequalities
 This includes material costs versus budget constraints, available time on production lines, etc.
- Identify the objective, as a linear function
 "Maximize 10x + 12y + 8z, our profit function" or
 "Minimize 2x + 3y + z, our unfunded cost function"

3.2: Practice is the best teacher (or at least a good one)

- On the activity hand-out, I have what I hope is a challenging and interesting problem
- How to decide which part-time job to take? You want money, but you have other constraints.
- On the front (no graph) we try to write down the situation mathematically, and on the back we try to find reasonable decisions to make
- On Tuesday, we'll talk about a systematic method to solve this when there are two variables
- On Thursday, we'll talk about how to solve this when there are between 2 and about 50,000 variables. Methods to handle half-a-million variables are barely more complicated and are used daily by all major businesses.

Homework: Tricky homework type

- Struggling is good; don't worry, don't give up
- You should be able to do all of B1 (and should be done) Today we learned to do HW B2 #s 6-7, and we've already learned 1-5.
- Most of the problems are easy; you can do them today
- I am just waiting to help my students with homework Tuesday and Thursday, 2:30pm-4:00pm, CB63
 8 other MA162 instructors also want to help
- If you have AX = B and you want B, just divide by A!

$$AX = B$$
$$A^{-1}AX = A^{-1}B$$
$$X = A^{-1}B$$