MA162: Finite mathematics

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January 11, 2012

Schedule:

- HW 0.1 is due Friday, Jan 13th, 2012.
- HW 0.2 is due Tuesday, Jan 17th, 2012.
- HW 1.1-1.4 are due Friday, Jan 20th, 2012.
- Exam 1 is Monday, Feb 6th, 5:00pm-7:00pm in CB106 and CB118.

Today we will cover two linear models and go over the syllabus.

Scheduling and predicting production

- A service club has a side business stuffing envelopes.
- They have a good system, stamp sponge, big boxes of envelopes
- Suddenly you are in charge of scheduling
- You know they could do:
  - 300 envelopes in 60 minutes
  - 480 envelopes in 90 minutes
  - 660 envelopes in 120 minutes
- How many do they stuff per minute?

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  - 5.3 envelopes per minute
  - 5.5 envelopes per minute
  - 6 envelopes per minute

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- It's weird that there is more than one answer. Oh well, back to business.

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- Eeek! While we were talking, it is down to 9 minutes!
- Can your team get 48 envelopes done in 9 minutes?
- What do you think?

(Left) Yes, we could totally do it in 9 at our standard rate

(Right) In 10 we could do it at our standard rate

(Both) We'd need magic stamp stuffing machines to get it done in under 15

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- Talk to your neighbor, especially if you disagree. Be ready to explain your answer, especially after we vote again.

The big order

- Well, that went poorly. They took 18 minutes to do it.
- Did they work twice as slow? Sneaky, they looked just as busy as usual.
- Oh well, last chance. How long does it take to do 900 envelopes?
- What do you think?

How do predict it?

- One idea is that it takes a little bit of time to get started. Moisten the sponges, open the boxes of envelopes, get comfortable in the ergonomic stuffing chair, etc.
- Once they are good and going, it is a nice steady rate, but the first few minutes are "wasted" getting ready.
- If we use this model, then how do we predict?
- What do we need to know?

Two key quantities

- Two really important numbers are:
  - How long does it take them to get ready?
  - How many envelopes do they stuff per minute **once they are ready**
- How do we figure these two numbers out?

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- Startup = 10 minutes,
  Steady rate = 6 envelopes per minute

Ch 1.3: Example 1: Linear depreciation

- In accounting, you keep track of assets (goods)
- But assets are also tax liabilities (bads)
- Old assets are like so whatever and are worth less
- For example:

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- Might be worth plotting it on a graph

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- This is just **slope**:
- $(x = 0, y = \$100k)$ and $(x = 5, y = \$30k)$ are two points on the graph
- The slope is

$$\frac{100 - 30}{0 - 5} = -14 \text{ thousand dollars per year}$$

- The bunny hops down \$14k every year.
- The **y-intercept** was the original \$100k starting value

Expectations

- This is a classroom of **courteous** and **professional** peers
- The material is **hard**; if we already knew it, we wouldn't be here
- We are busy people; clear **deadlines** are needed to budget time
- We are part of a tradition of several thousand UK students who have mastered this material over the past five years
- Class policies must be consistent across sections and years

Syllabus

- Our time is valuable; clear policies and procedures avoid waste
- The **syllabus** describes the policies and procedures of this course.
- Make sure you are comfortable with the **absence policy**, the **grading policy**, and the **exam dates**.
- Make sure you are committed to handling the **time pressure**:
  - Weekly homework, mandatory, no late work accepted
  - Twice weekly full class meetings, mandatory
  - Weekly small recitation meetings, mandatory
  - Monthly Monday evening exams, mandatory

Homework!

- Homework is due THIS Friday. Online.
- At 2pm, I will be in the mathskeller, CB63.
- Computers that work, assignments takes about 3 minutes
- Chapter 1 due next Friday, should take an hour if you've studied.