MA162: Finite mathematics

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January 9, 2013

Schedule:

- HW 0A due Friday, Jan 11, 2013
- HW 1.1-1.4 due Friday, Jan 18, 2013
- HW 2.1-2.2 due Friday, Jan 25, 2013
- HW 2.3-2.4 due Friday, Feb 01, 2013
- Exam 1, Monday, Feb 04, 2013, from 5pm to 7pm

Today we will introduce linear models (1.3), go over class policies, and cover linear depreciation (1.3)

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 envelopes per minute
  - 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

Syllabus

- The syllabus was emailed to you this morning.
- Some other important things on it, but here is the short version
- Grading: 10% HW, 10% REC, four 20% exams
- Exams: Mondays 5pm to 7pm on Feb 4, Mar 4, Apr 8
- Final exam: Tuesday Apr 30 6pm to 8pm
- Absence policy: text me at 512-522-5137 within 12 hours of exam absence or it is a 0

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