My office hours:

Today 1:30-2:45pm in MSC

Closing Tue: Supp. 8-9

Closing Thu: 1.1, 1.2, 1.3

Midterm 1 is Tuesday, Oct 25

See Week 3 Newsletter online

Entry Task:

Let's start with a 10 min Q & A on the business terms. Do you have any questions on these topics?

On the TC, VC graphs:	*On the MC, AC, AVC graphs*:
Computing MC, AC, AVC?	Computing TC and VC?
Finding BEP and SDP?	Finding BEP and SDP?
Given a price, what do you do?	Given a price, what do you do?
Maximizing profit?	Maximizing profit?
Finding is FC?	

Section 1.1: Linear Equations (Skills)

Motivation: So far this entire course has been about **rates**. When we use a rate to predict the future, the equation we get is a line.

Ex: Husky football has average 49.5 points per game. In total they have scored 297 points so far this season. If this rate continues, how many total points will they have x games from now?

Total points = $297 + 49.5x$

Ex: For electricity I pay a flat fee of $30 per month plus $0.05 per kilowatt hour of use.

"payment for x kilowatt hours of use"

= $30 + 0.05x$

Ex: My savings earns 9% interest each year. Starting value = x

"interest from x (1 year)" = $0.09x$

"total value (1 year)" = $x + 0.09x$

Ex: The ST stock starts at $10 and increasing at a rate of $5/month

$ST(x) = 10 + 5x$ = `value in x months'

Ex: Hats sell for $5 per item.

$TR(x) = 5x$

We manufacture hats. Fixed costs equal $200 each day and it costs $3 to produce each hat.

$TC(x) = 200 + 3x$.

Mathematical expressions:
a formula involving letters, numbers and operations; no equal sign
Examples:

$$\frac{5x}{2} - 3,$$

$$10 + \sqrt{3 + x},$$

$$5x - \frac{4}{x^{3/2}}$$

Examples of <u>linear equations</u>:

3x + 4 = 10,

$$\frac{5x}{2} - 2 = 4x,$$

4 (3 − 2x) = 16 + 5x

The goal will be to solve for *x*.

Note: All <u>equations</u> have equals signs **and** mathematical expressions on **both** sides.

Examples of <u>linear functions</u>:

ST(x) = 10 + 5x

TR(x) = 5x

TC(x) = 200 + 3x

Note: All have a function name on the left! These are defining a rule. We are NOT solving these, these aren't equations. These are just giving a function a name.

Linear functions typically are written:

f(x) = mx + b   (slope-intercept)

   or

f(x) = m(x-x_0) + y_0 (point-slope)

Fastest way to a linear function

Get two points on the line:

$(x_0, y_0), \quad (x_1, y_1)$

Step 1: Find the slope: $m = \dfrac{y_1 - y_0}{x_1 - x_0}$

Step 2: Write: $y = m(x - x_0) + y_0$

Example: Find the equation of the line that goes through the points
   (2,10) and (4, 13)

(a) Write in the point-slope form?
(b) Write in slope-intercept form?
(c) What is the y-intercept?
(d) Sketch a graph of the line.
(e) Is the point (5,16) on the line?

Skills Practice:

Solving, Inequalities, etc..

Some Application Problems:

Example: Cupcake Business
    FC = $300,
    selling price = $1.50/cupcake
    production costs = $0.50/cupcake
At what quantity will the profit be
zero? (i.e. you will break even).
At what quantity will profit be $450?

Example: You are told you have to average above 75% on the three exams to pass the class.
Assume you get 65% on you first test and 78% on your second test. What does your final exam score need to be in order to pass the class?

Directly from homework:

10) A retired woman has $240,000 to invest. She has chosen one relatively safe investment fund that has an annual yield of 9% and another, riskier fund that has a 13% annual yield. How much should she invest in each fund if she would like to earn $24,000 per year from her investments?