

Fall 2006
Week-in-Review #1
courtesy: Kendra Kilmer
(covering Sections 1.1-1.5)

Sections 1.1, 1.2

- slope of a line: $m = \frac{y_2 - y_1}{x_2 - x_1}$
 - Equations of Lines
 - Point-Slope Form: $y - y_1 = m(x - x_1)$
 - Slope-Intercept Form: $y = mx + b$
 - Horizontal Line through (a, b) is $y = b$
 - Vertical Line through (a, b) is $x = a$
 - Two lines are parallel if they have the same slope.
 - Two lines are perpendicular if their slopes are negative reciprocals of each other.
1. Find the equation of the line that passes through the point $(-2, 6)$ and
 - (a) has a slope of $2/5$.
 - (b) has a slope of 0 .
 - (c) has an undefined slope.
 2. Find the slope of the line passing through the points $(1, -2)$ and $(-4, 2)$.
 3. Find the equation of the line in problem 2.
 4. Find the equation of the line that is parallel to the line $2x - 4y = 7$ and passes through the point $(-1, -4)$.
 5. Find the equation of the line that intersects the y -axis at -5 and the x -axis at 3 .
 6. The line passing through the points $(2, 7)$ and $(-3, -2a)$ is perpendicular to the line passing through the points $(a + 1, 2)$ and $(-2a, 4)$. Find the value of a .

Sections 1.3, 1.4

- Linear Depreciation: (t, V) where t is time and V is book value
 - Linear Supply and Demand Curves: (x, p) where x is the quantity and p is the unit price
 - Market Equilibrium: the point at which the consumers and suppliers agree upon (intersection point of the supply and demand curves)
 - Linear Cost, Revenue, and Profit Functions
 - Cost Function: $C(x) = cx + F$
 - Revenue Function: $R(x) = sx$
 - Profit Function: $P(x) = R(x) - C(x)$
 - Break-Even Point: Intersection of the Cost and Revenue Functions
7. A car was purchased in 2003 for \$18,900. If the car is to be depreciated linearly over a 10 year period with a scrap value of \$3,500, find the book value of the car in 2010.

8. At a unit price of \$30, consumers in College Station will demand 5,000 First Yell Tickets. If the price decreases by \$5, the consumers will demand 2,500 more tickets. If the demand for First Yell Tickets is known to be linear, find the demand equation and use it to determine how many tickets will be demanded at a unit price of \$35.
9. Little Ags, Inc. produces miniature yell leader outfits for kids. Their factory has a monthly fixed cost of \$8,000 and sells the outfits for \$59. If it costs the company 25% of the selling price to produce the outfits, determine the linear cost, revenue, and profit functions. How many outfits must the company sell to make a monthly profit of \$2,000?
10. The demand and supply equations for a certain type of TV dinner are given by $2x + 9p - 45 = 0$ and $3x - 7p + 7 = 0$ where x represents the quantity in 1000's and p represents the unit price for the TV dinner. Find the market equilibrium.
11. It costs a company \$3,500 to produce 3,000 pencils whereas it cost the company \$1,500 a month even if they don't produce any pencils. If they sell the pencils for \$.75 and the cost, revenue, and profit functions are known to be linear, determine how many pencils they must make in a month to break even.

Section 1.5

- The Best Fit Line/Equation of Least Squares/Linear Regression
 - Enter list into L1 and L2 (STAT→1:Edit)
 - STAT→CALC→4:LinReg(ax+b)
 - Once you have LinReg(ax+b) on your home-screen, to store the equation into Y_1 hit VARS→Y-VARS→1:Function→1:Y₁ and then hit ENTER.
 - Recall r is the correlation coefficient. It is a number between -1 and 1 . The closer it is to 1 in magnitude, the better the line fits the data.
12. The table below gives the percent of people 25 years and over who have completed four or more years of college (U.S. Bureau of the Census)

Year	1980	1985	1990	1995	2000
Percent	17.0	19.4	21.3	23.0	25.6

- (a) Find the equation of the best fit line. (Let $x = 0$ represent 1980.)
- (b) How well does the model fit the data?
- (c) Use your model to predict the percentage of people over 25 who will have completed four or more years of college in 2010.
- (d) According to your model, when will 50% of the people over 25 have completed four or more years of college?