Cheat Sheet 2

Math 141

Let A = accumulated balance after Y years
P = starting principal
APR = annual percentage rate (as a decimal)
n = number of compounding periods per year
Y = number of years (may be a fraction)
PMT = regular payment (deposit) amount
a = inflation rate (a decimal)
i = interest rate (a decimal)

Simple Interest Formula0: $A = P*(1 + APR*Y)$ Compound Interest Formula: $A = P(1+\frac{APR}{n})^{nY}$

Annual Percentage Yield: APY $APY = (1+\frac{APR}{n})^n - 1$

Formula for Continuous Compounding: $A = P * e^{APR*Y}$

Savings Plan Formula: $A = PMT * \frac{[(1+\frac{APR}{n})^{nY}-1]}{\frac{APR}{n}}$

Total and Annual Return: $totalreturn = \frac{A-P}{P}$
$annualreturn = \left(\frac{A}{P}\right)^{(1/Y)} - 1$

Current Yield of a Bond: $\text{current yield} = \frac{\text{annual interest payment}}{\text{current price of bond}}$

Loan Payment Formula: $PMT = P * \frac{\frac{APR}{n}}{\left[1-\left(1+\frac{APR}{n}\right)^{(-nY)}\right]}$

The CPI Formula $\frac{CPI_X}{CPI_Y} = \frac{price_X}{price_Y}$

The Present Value of a principal P, Y years into the future, r=APR, a=annual inflation:
$A = P * [\frac{1+r}{1+a}]^Y$

Real Growth g: $g = \frac{r-a}{1+a}$

Real Growth over Y years: $g(Y) = [1+\frac{r-a}{1+a}]^Y - 1$

The Tax Table:

	single	m(joint)	m(separate)	head_household
10%	1 - 7,550	1-15,100	1 - 7,550	1-10,750
15%	7,551 - 30,650	15,101 - 61,300	7,551 - 30,650	10,751 - 41,050
25%	30,651 - 74,200	61,301 - 123,700	30,651 - 61,850	41,051 - 106,000
28%	74,201 - 154,800	123,701 - 188,450	61,851 - 94,225	106,001 - 171,650
33%	154,801 - 336,550	188,451 - 336,550	94,226 - 168,275	171,651 - 336,550
35%	336,551+	336,551+	168,276+	336,551+

The mean of $x_1, x_2, ...x_n$ is $\mu = \frac{x_1+x_2+...+x_n}{n}$.

The variance s^2 of $x_1, x_2, ...x_n$ is $s^2 = \frac{(x_1-\mu)^2+(x_2-\mu)^2+...+(x_n-\mu)^2}{n-1}$.

The standard deviation s is the square root of the variance s^2.

Quartiles of Normal Distributions:

$$Q_1 = mean - .67 * s$$
$$Q_3 = mean + .67 * s$$

The $68 - 95 - 99.7$ Rule for normal distributions:
68% of the observations fall within 1 standard deviation of the mean.
95% of the observations fall within 2 standard deviations of the mean.
99.7% of the observations fall within 3 standard deviations of the mean.

Given data (x_1, y_1), (x_2, y_2), ... (x_n, y_n), with means μ_x, μ_y and standard deviations s_x, s_y.
The correlation between variables x and y is

$$r = \frac{1}{(n-1)s_x s_y}\left[(x_1-\mu_x)(y_1-\mu_y) + (x_2-\mu_x)(y_2-\mu_y) + ... + (x_n-\mu_x)(y_n-\mu_y)\right].$$

The least squares regression line is $y = ax + b$.
where $a = r * \frac{s_y}{s_x}$ and $b = \mu_y - a\mu_x$.

For a simple random sample of size n,
the sample proportion of successes is $p' = \frac{\text{count of successes in the sample}}{n}$
The mean of the sampling distribution is p
and the standard deviation is $\sqrt{\frac{p(1-p)}{n}}$.
The $68 - 95 - 99.7$ Rule applies here aswell.