Worksheet 4B

If P is the *principal amount* and i is the *interest rate per compounding period*, then the *accumulated balance* after N *compounding periods* is

$$A = P(1 + i)^N$$

If the interest is only calculated on the principal amount (simple interest), then the accumulated balance after N periods is

$$A = P(1 + Ni)$$

Annual Percentage Rate (APR): standard measure of interest rate, given by $APR = i \cdot N$.

Annual Percentage Yield (APY): the gain (as percentage) in one year.

If *P is the principal amount* and the interest is *compounded continuously*, then the accumulated balance after *n years* is

$$A = Pe^{n \cdot APR}$$

In Problems 1-3, compute the accumulated balance in each account after the stated period of time.

1) You deposit $5000 at an APR of 4% for 10 years and the interest is compounded annually.

2) You deposit $10,000 at an APR of 3.7% for 12 years and the interest is compounded quarterly.

3) You have credit card debt of $5000 which grows an APR of 20% compounded monthly. You don't pay for 5 months.

Problem 4 and 5 are real-life examples of simple interest.

4) You lend a friend $3000 and charge him a simple interest of 1% per month. If your friend is to pay you in full in 3 months, how much does he/she have to pay?

5) You deposit $5000 in an account with an annual interest rate of 1% per month. You withdraw the interest at the end of each month. How much do you have in total in one year?

In Problem 6 and 7, find the annual percentage yield (APY) to the nearest 0.01% in each case.

6) A bank offers an APR of 3.2% compounded monthly.

7) A bank offers an APR of 4.1% compounded weekly.

8) You deposit $10,000 into your account. The APR is 4%. What will you have in 5 years if

(a) the compounding period is 1 year

(b) the compounding period is 1 month

(c) the compounding period is 1 day

(d) the compounding period is 1 hour

(e) the compounding period is 0 hour (continuous compounding)