MA 162

Week 13 Recitation Worksheet (Tuesday)

You must show all work to receive full credit.

We'll spend the rest of the semester considering the mathematics of finance. This week's worksheet introduces **simple interest** and **discounts**.

It costs money to borrow money. The cost one pays to borrow money is called *interest*. The money being borrowed or loaned is called the *principal* or *present value*. When interest is only paid on the original amount borrowed, it is called *simple interest*. The interest is charged for the amount of time the money is borrowed. If an amount P is borrowed for a time t at an interest rate of r per time period, then the interest I that is charged is
$$I = Prt.$$

The total amount A of the transaction is called the *accumulated value* or the *future value*, and is the sum of the principal and interest:
$$A = P + I = P + Prt = P(1 + rt).$$

1*. (HW17 #1) What is the interest if \$600 is borrowed for 6 months at 8% annual simple interest?

2. (HW17 #2) Find the amount due if \$400 is borrowed for 4 months at 7% annual simple interest.

3. (HW17 #4) Find the length of the loan in months if \$700 is borrowed with an annual simple interest rate of 8% and with \$774.67 repaid at the end of the loan.

4. (HW17 #5) Find the annual simple interest rate of a loan where $1000 is borrowed and $1060 is repaid at the end of 13 months.

Interest can also work in your favor!

5*. (HW17 #3) Charlie wants to buy a $200 stereo set in 9 weeks. How much should he invest now at 16% annual simple interest to have the money in 9 weeks?

6. (HW17 #6) An investment pays simple interest, and doubles in 9 years. What is the annual simple interest rate?

Banks sometimes deduct the simple interest from the loan amount at the time the loan is made. When this happens, we say the loan has been *discounted*. The interest that is deducted is called the *discount* and the actual amount given to the borrower is called the *proceeds*. The amount the borrower is obligated to repay is called the *maturity value*. If an amount M is borrowed for a time t at a discount rate of r per time period, then the discount D is

$$D = Mrt.$$

The proceeds P is given by

$$P = M - D = M - Mrt = M(1 - rt).$$

7*. (HW17 #7) What are the proceeds for a discounted loan of $600 repaid in 9 months at 12.25% annual simple interest?

8. (HW17 #8) Consider a discounted loan of $800, where the proceeds equal $704. The loan is repaid at the end of 16 months. Find the annual simple discount rate.