Homework Check: none

Note: Simple and Compound Interest

Simple interest is the interest earned on the principal while compound interest in interest earned on both the principal and the accumulating interest. The formulas are also very different. The simple interest formula is only a multiplying formula while the compound interest formula is an exponential formula. The formulas you are already familiar with from last year are as follows:

**Simple Interest Formulas**
- Interest only: \( I = Prt \)
- Amount and interest together: \( A = P(1 + rt) \)

**Compound Interest Formulas**
- Amount: \( A = P(1 + i)^n \)
- Principal (or present value): \( P = A(1+i)^{-n} \)

**Remember when working with interest and compounding periods:**
- annually is one time per year
- semi-annually is two times per year
- quarterly is four times per year
- monthly is twelve times per year
- daily is 365 times per year

Whenever working in this unit, first find which type of interest you are working with, discover whether you are looking for interest and/or principal, then finally discover whether you are looking for the values today or in the future. These things will have direct effects on which formulas you use! For example,

1. Find the amount of a $2500 loan taken out over 3 years
   a) under 7% simple interest
      \[
      A = P(1 + rt) \\
      A = 2500(1 + 0.07(3)) \\
      A = 2500(1 + 0.21) \\
      A = 2500(1.21) \\
      A = $3025
      \]
   b) under 5% interest compounded semi-annually
      \[
      \frac{0.05}{2} = 0.025 \\
      n = 2(3) = 6 \\
      A = P(1 + i)^n \\
      A = 2500(1 + 0.025)^6 \\
      A = 2500(1.025)^6 \\
      A = $2899.23
      \]
2. Find the amount needed to be invested today in order to have $3000 in 5 years at 6% compounded quarterly.

\[
\frac{0.06}{4} = 0.015
\]

\[
n = 4(5) = 20
\]

\[
P = A(1 + i)^n
\]

\[
P = 3000(1 + 0.015)^{-20}
\]

\[
P = 3000(1.015)^{-20}
\]

\[
P = $2227.41
\]

◆ Homework: FCM 11 handout p. 454 # 1 - 8