<u>SIMPLE INTEREST</u>
Simple interest is interest computed as a percentage of the principal
Simple interest earned: $I = Prt$
      I = interest earned P = principal r = interest rate (decimal form) per year t = time period (in years)
Accumulated amount (simple interest): $A = P + Prt = P(1 + rt)$

Example: If a bank loans $678 to an individual for 2½ years at 5.75% simple interest, what will be the amount repaid on the loan?

Example: If a $1000 deposit grows in value to $1024 after 8 months, what is the simple interest rate that is earned?

<u>COMPOUND INTEREST</u>
Compound interest – interest that is computed periodically as a percentage of the sum of the principal and the interest already accrued

Example
If a person borrows $4000 for two years at an interest rate of 6.49% compounded annually, what is the amount that must be repaid on the loan at the end of the two years?

Example
A sum of $100 is invested at 10% annual interest compounded quarterly. How much is in the account after 1 year.

Using the TVM Solver Application
Locating TVM Solver: APPS → Finance → TVM Solver…Parameters in TVM Solver:
      N: total compounding periods = (# of cmpd periods/yr)*(# of yr)   *FV*: future value (accumulated amount)
      I%: interest rate (percent form)   *P/Y*: # of payments per year
      PV: present value (principal amount)   *C/Y*: # of compounding periods per year
      PMT: payment amount   *PMT: END BEGIN* – keep this on END
        Annually, P/Y = 1   Semiannually, P/Y = 2   Quarterly, P/Y = 4
        Monthly, P/Y = 12   Weekly, P/Y = 52   Daily, P/Y = 365

Example: A sum of $10,000 is invested at 5% annual interest for 1 year. Determine the interest earned when the account is compounded
a) Annually   b) Semi-annually   c) Quarterly   d) Monthly   e) Weekly   f) Daily   g)Hourly

Continuous compound interest
Accumulated amount (continuous compound): $A = Pe^{rt}$
      A = accumulated amount P = principal r = interest rate (decimal form) t = time (years)
*Note: e is the natural number. $e \approx 2.718$ ...

Example: A sum of $10,000 is invested at 5% annual interest for 1 year. Determine the interest earned when the account is compounded continuously for 1 year.

Example: What is the amount repaid on a loan of $600, if the loan charges 8.6% compounded continuously for 44 months?

Effective interest rate
The effective interest rate –is the corresponding annually compounded interest rate that produces the same interest as a given annual rate in one year
*Computing effective rate using TI-83/84:
      APPS → Finance → Eff(
      Eff(interest%, number of compounding periods per year)

Example: The Bank of the North offers a savings account that pays 2.6% interest, compounded quarterly. The Bank of the East offers a similar savings account that pays 2.58%, compounded daily. Compute the effective rate for each bank, and determine which bank offers the better deal for an investor.

Example: Joey purchases 100 shares of a particular stock for a total of $20,000 in 2006. He sold the shares in 2008 for $22,222. Determine the effective annual rate of return on the investment, rounded to two decimal places.

Example: The Bank of the West offers a savings account that pays 3.15% compounded weekly. If Dorothy invests $400 in this type of savings account for twenty years, what will be the amount in her account at the end of twenty years?

Example: Webster borrows $250 at an interest rate of 12% compounded monthly. At the end of two years, what will be the amount to be paid on the loan?

Example: Suppose you invest $1000 in a savings account toward the purchase of an Aggie ring with a price of $1200. If interest earned by the account is 4% compounded daily, how long will it take your investment to grow to $1200?

Example: Sandy is planning a vacation to Japan in two years. If the estimated cost of her trip is $2700, how much should she deposit now in an account in order to have the money in three years, if the account pays 6% compounded semiannually?

ANNUITIES
An annuity is an account to which regular payments are made. An annuity that is certain and simple has the following properties:
1.   The payments are made at fixed time intervals
2.   The periodic payments are of equal size
3.   The payments are made at the end of the interval
4.   The interest is paid at the end of the interval
Many loans and savings plans are certain and simple annuities

Example: Suppose you want to save for an Aggie ring with a price of $1200 by making regular monthly deposits. If you find an account that pays 4% compounded monthly for 36 months, how much needs to be deposited each month? How much interest is earned?

Example: You are saving for a pair of diamond earrings. You put away $10 every week into an account that pays 8% compounded weekly. How long until you have $800? How much interest is earned?

Example: To save for retirement you make annual payments of $3000 to an account that pays 9% annual interest compounded annually. How much will you have after saving for 10 years? For 20 years? For 30 years? How much interest is earned in each case?

Example: You find that you can afford a monthly mortgage payment of $1600. You find a loan that charges 6% annual interest compounded on the outstanding balance each month for 25 years. How large of a loan can you get? How much interest will be paid in all?

Example: A lottery prize is $20,000,000 which is paid in 20 annual payments of $1,000,000 each. If the winner is given $1,000,000 now, how much needs to be deposited in an account paying 8.5% annual interest compounded annually if the winner is to be paid $1,000,000 per year at the end of the year for the next 19 years?