

## Section 11.3 Compound Interest.

Investment - The use of money for income or profit

Two types of investments:

1. **Fixed investment** - guaranteed principal and interest is computed at a fixed rate. Invest \$1000 rate is 2% per year savings account, money market, certificates of deposit (CD), and government bonds.
2. **Variable Investment** - neither the principal nor interest is guaranteed. You can lose your money. Stocks, mutual funds, commercial bonds

Simple interest is calculated once for the period of a loan or investment.

On a savings account at most banks use compound interest. A bank computes the interest periodically (daily, weekly, quarterly, semi-annually or annually) and adds this interest to the original principal.

The bank is computing interest on interest.

## Example 1

Marjorie Thrall recently won the \$1000 first prize in a raffle contest. Marjorie deposits the \$1000 in a 1-year CD paying 2% compounded quarterly. Find the amount, A, to which the \$1000 will grow in 1 year.

$$\begin{aligned}
 I &= 1000 (.02)(.25) = \$ 5 \quad 1005 \\
 I &= 1005 (.02)(.25) = 5.03 \\
 I &= 1010.03 (.02)(.25) = 5.05 \\
 I &= 1015.08 (.02)(.25) = 5.08 \quad \boxed{1020.16} \\
 I &= 1000(.02)(1) = 20
 \end{aligned}$$

## Compound Interest Formula

$$A = P \left( 1 + \frac{r}{n} \right)^{nt}$$

A = Amount accumulated

P = principal

r = interest rate

n = compoundings per period

t = ~~number of periods~~ *time / years*

$$A = 5600 \left( 1 + \frac{.075}{12} \right)^{(12 \cdot 10)}$$

$$A = 11827.56$$

## Example 2

Kathy Mowers invested \$5600 in a savings account with an interest rate of 7.5% compounded monthly. If Kathy makes no other deposits into this account, determine the amount in the account after 10 years.

## Example 3

Calculate the interest on \$650 at 8% compounded semiannually for 3 years.

$$A = 650 \left( 1 + \frac{.08}{2} \right)^{(2 \cdot 3)} = 822.46$$

10. \$5000 for 3 years at 7% compounded quarterly  $n=4$  6157.20
11. \$7000 for 3 years at 5.5% compounded monthly  $n=12$  8252.64
12. \$4000 for 2 years at 6% compounded semiannually  $n=2$  4502.04
13. \$8000 for 2 years at 4% compounded daily (use  $n = 360$ ) 8666.26

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