ANNUITIES

DEFINITIONS:

*Annuity:* equal payments paid at equal time intervals.

*Payment period:* time between successive payments.

*Periodic payment:* the amount of each payment.

*Ordinary annuity:* periodic payments made at the end of each period

FORMULAS AND EXAMPLES:

\[ A = RS, \quad \text{where} \quad S = \frac{(1 + i)^n - 1}{i} \]

\[(FV \ of \ an \ ordinary \ annuity)\]

\[ i = \text{interest rate per period.} \]
\[ n = \text{number of periods.} \]
\[ R = \text{amount of each periodic payment (sometimes denoted by PMT).} \]
\[ A = \text{FV or amount.} \]

**EXAMPLE:** A family enters a savings plan whereby they will invest $1000 at the end of each year for 5 years. The annuity will pay 7% interest compounded annually. Find the value of the annuity at the end of the 5 years.

Step 1:
\[ i = .07 \]
\[ n = 5 \]
\[ R = 1000 \]

Step 2:
\[ S = \frac{(1 + i)^n - 1}{i} \]
\[ \text{and} \quad A = RS \]

Step 3:
\[ S = \frac{(1 + .07)^5 - 1}{.07} = 5.75074 \]

Now solve for A:
\[ A = RS = 1000 \times 5.75074 = $5750.74 \]