U8D2 MCR 3UI **Ordinary Annuities**

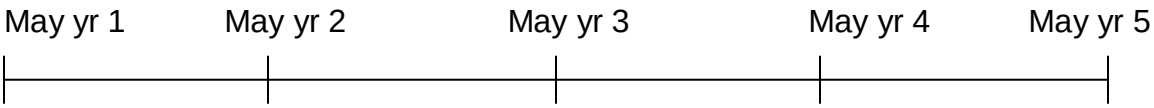
Scenario: Frank deposits $1000 into a savings account (5%/a compounded monthly) every year for 10 years. How much will his investment be worth at the end of 10 years?

What makes the above scenario difficult to calculate?

Annuity: a series of equal payments/deposits made at regular intervals of time. Each payment/deposit is made at the end of each payment period.

Example 1: Nigel deposits $500 on May 1st, every year for 5 years. The investment earns 8%/a compounded annually. How much will be in the account after he makes his final deposit?

Solution: Use the timeline to visualize how/when the interest is earned.



Total Amount =

reverse the sum:

Wow!! This looks like a _____ with a = ____

and r = ____ and n = _____.
Therefore use the formula: $S_n =$

Ordinary Annuity Formula

$$A = \frac{R[(1+i)^n - 1]}{i}$$

R = payment made at each interval

i = interest rate per compounding period

n = total number of payments/deposits

Example 2: Jane deposits $100 on March 31, June 30, September 30 and December 31 every year for 20 years. The investment pays 4%/a compounded quarterly. How much is in the account when the last payment is made?

A =

R =

i =

n =

Example 3: You want to retire with $1000000. What equal monthly payment will achieve this goal? (Assume 35 years of regular monthly deposits). The account pays 10%/a compounded monthly.

A =

R =

i =

n =

** How does this change if you make regular deposits for 40 years?

Example 4: Suppose you deposit $1000 into an investment account every 6 months for 10 years, then leave the amount on deposit for another 30 years. The money earns an average return of 9% compounded semi-annually. How much will be in the account after 40 years?
Tip: there are 2 different investments