## This Tutorial Series Will Cover the Following Midterm Topics:

## Time Value of Money:

Type of Cash Flows Streams:

- Single Dollar
- Annuity
- Combined Questions (Single Dollar/Annuity Cash Flows)
- Annuity Due
- Delayed Annuity
- Growing Annuity
- Perpetuity
- Growing Perpetuity
- Irregular Cash Flows
- Mortgage Problems


## Working with Interest Rates

- APR
- EAR
- Period Rates


## Bonds

- Bond Basics - Theory
- Discount Bond vs. Premium Bond
- Bonds - Solve for the Coupon Rate
- Bonds - Rate of Return (Bonds held for one year)
- Bonds - Rate of Return (Bonds held for multiple years)


## Stocks

- Stock Basics - Theory
- Stock Price - Dividend Discount Model
- Stock Price - Constant Growth Dividend Discount Model
- Stock Price - Constant Dividend
- Stock - Dividend Yield

Learn Calculator Tips!

## TVM: Time Value of Money

When valuing cash flows we will use the following inputs as described below for the TVM variables; either on the calculator or in the mathematical equations.

- Number of Periods (N)

This is the number of time periods that we want to move the cash flow. N is not the number of years but rather N must be the total $\#$ of compounding periods.

- Interest Rate per Year (I/Y)

This tells the calculator the interest rate per year. The interest rate quoted in questions can be either an EAR, APR or Period Rate. More on this will come later.

- Present Value (PV)

This tells us the present value of the cash flow in a particular timeline.

- Future Value (FV)

This tells us the future value of the cash flow.

- Payment (PMT)

This represents the value of an annuity cash flow.

- Growth Rate (g)

This represents the rate at which the cash flow is changing over time. This variable does not exist on the calculator, therefore every time a problem involves a growth rate, we must solve it mathematically.

## Single Dollar Cash Flows

Example 1 - Solve for Future Value
What is the future value of $\$ 1,000$ invested today for 5 years in an investment account earning $5 \%$ compounded annually?

Example 2 - Solve for Present Value
If you know that you want $\$ 5,000$ saved for a new car purchase in 5 years, what should you invest now if current rates are $5 \%$ compounded annually?

Example 3 - Solve for Interest Rate
If I promise to pay you $\$ 5,500$ twelve years from now in return for a loan of $\$ 1,000$ today, what is the effective annual interest rate (compounded annually) for this agreement?

Example 4 - Solve for Number of Periods
If you plan to deposit $\$ 5,000$, how many years would it take until you have $\$ 10,000$ saved if interest rates are $5 \%$ compounded annually?

## Annuity Cash Flows

Example 5 - Solve for Future Value
How much can be accumulated for retirement if $\$ 15,000$ is deposited annually and the account earns $8 \%$ interest compounded annually for 4 years?

Example 6 - Solve for Present Value
What is the present value of an annuity of four annual payments of $\$ 8,000$ if the appropriate interest rate is $8 \%$ compounded annually?

Example 7 - Solve for Annuity Payments (PMT)
If you need $\$ 1,000,000$ saved up for when you retire in 20 years, how much do you need to deposit in a savings account annually if interest rates are $8 \%$ compounded annually?

Example 8 - Solve for Interest Rate
If you plan to make 10 equal payments of $\$ 1,500$ to pay off a loan of $\$ 10,000$, what is the effective annual rate (compounded annually) of this loan?

Example 9 - Solve for the Number of Periods ( n )
You want to save up $\$ 100,000$ for the purchase of a new home by depositing $\$ 12,000$ in a bank account annually. How many years/periods would it take to accomplish this goal if the interest rates are $8 \%$ compounded annually?

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