

# Financial Math

**(Use this Workbook for both the QAFP Exam and the CFP Exam)**

For the QAFP and CFP Exams, candidates are expected to have a high degree of understanding of time value of money principles, security valuation and basic statistics.

Basic formulas are provided on the exam, but you must know how to use them!

Candidates report that a lot of relatively easy marks are often missed because of a lack of familiarity with basic Math skills and most surprising – simply not knowing how to use a financial calculator correctly.

If you are weak in Math and have never used a financial calculator, we suggest you use the Texas Instruments BA II PLUS....do not buy the HP 10B or 12C....you will spend weeks just learning how to turn it on!

The BA II PLUS is a much simpler machine to operate, it can do all of the required calculations and it costs about one half the price of the HPs.

## **Fundamental Math Concepts**

Below are some basic math concepts that you should be aware of in order to be able to perform some of the calculations for the exam.

### **Percent and Decimals**

Rates of return, interest rates, mortgage rates and savings rates are often expressed as a percentage, such as 3%, 4.5% or 19%.

When performing financial calculations, percentages need to be translated into decimal format to make the math work.

In simple terms, *percentage means “out of 100”*, so it follows that:

3% means  $3/100$  or 0.03

4.5% means  $4.5/100$  or 0.045

19% means  $19/100$  or 0.19

### **Exponents and Roots**

You may (or may not) remember *exponents* from your school days as “...*a number taken to the power of...*”

$4^3$  means  $4 \times 4 \times 4 = 64$

To calculate exponents we use the  $\boxed{y^x}$  button on our financial calculator.

To solve  $4^3$ , enter  $4 \boxed{y^x} 3 =$  and you get 64

#### **Quick example:**

Calculate,  $1.03^5$ :

#### **Solution:**

To solve  $1.03^5$ , enter  $1.03 \boxed{y^x} 5 =$  and you get 1.15927

## Quick Summary – Time Value of Money Concepts

### A. Types and measures of investment returns

#### Time Value of Money – Lump-Sum

Formulas on the left and the corresponding calculator key strokes on the right, followed by an example.

Present value of a lump sum payment

Enter the following information given in the question:

$$PV = \frac{FV}{(1+I)^n}$$

solve for:

**Example:**

You require \$10,000 in 5 years to payoff your car loan. If your savings can grow annually at 8% (ignoring taxes), how much must you deposit in your savings account today?

$$PV = \frac{\$10,000}{(1.08)^5}$$

$$= \$6,805.83$$

Enter -\$10,000  , 5  , 8  , 0

Solve for  = \$6,805.83

Future value of a lump sum payment

Enter the following information given in the question:

$$FV = PV(1+I)^n$$

solve for:

**Example:**

If your savings can grow annually at 11% (ignoring taxes), how much will \$3,500 grow to in 15 years?

$$FV = \$3,500 (1.11)^{15}$$

$$= \$16,746.06$$

Enter -\$3,500  , 15  , 11  , 0

Solve for  = \$16,746.06

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**Examples:**

Your client stated that she will need \$10,000 in 4 years to pay for her daughter's wedding. Your client would like to know the *minimum amount* of money she would need to invest in a time deposit in order to achieve her goal? Assume the current rate on 4 year time deposits is 4%.

The solution is:  
FV = 10,000, N = 4, I = 4, PMT = 0, CPT PV = \$8,548.04

Your client has \$5,250 in cash in an RRSP account. What will the account balance be at the end of 10 years if you were to invest the entire amount in a Government of Canada Strip Bond that is yielding 6% per annum.

The solution is:  
PV = 5,250, N = 10, I = 6, PMT = 0, CPT FV = \$9,401.95

***Exam Tip:***

Make sure you are comfortable with your financial calculator. Many exam candidates make mistakes because they do not know how to use their calculator correctly!

Simple time value of money questions do show up on the Exam and are easy points!

**Effective Annual Rate (EAR)**

The EAR is the rate of return actually being earned after adjusting for compounding frequency.

$$\text{EAR} = (1 + i/n)^n - 1$$

Where:

i = stated annual rate

n = compounding frequency

**Quick Example:**

Assume an investor buys an 8.5% semi-annual pay bond for \$1,065.52. **Calculate** the effective annual rate of return assuming the bond matures in two years.

**Solution:**

**Step 1, calculate the YTM for the bond:**

On your financial calculator enter:

FV = \$1,000, PV = -\$1,065.52, N = 2x2 = 4, PMT = 85/2=42.5, Solve for I = 2.508%

this is the semi-annual yield!

**Step 2, use the formula to calculate the effective yield:**

$$\text{EAR} = (1.02508)^2 - 1 = 5.078\%$$

### **Current Yield - Stocks and Bonds**

The current yield on a stock or bond is a measure that provides an investor with a quick and simple indication of the return potential for an investment.

The current yield is the income, dividend or interest, divided by the market price of the security. Candidates should realize that this is a one time yield measure as the market price of the security can change.

### **Current Yield (Dividend Yield) - Stocks**

$$\text{Current Yield} = \frac{\text{Dividend}}{\text{Current Market Price}} \times 100$$

#### **Example:**

You buy one share of BCE for \$33, BCE pays an annual dividend of \$2.80 dividend?

What is the current dividend yield on the BCE shares?

$$\begin{aligned} \text{Dividend Yield} &= \frac{\$2.80}{\$33} \times 100 \\ &= 8.48\% \end{aligned}$$

### **Current Yield - Bonds**

$$\text{Current Yield} = \frac{\text{Coupon in \$}}{\text{Current Market Price}} \times 100$$

#### **Example:**

Calculate the YTM for a 6 year annual pay 10% GOC bond purchased at 975.

What is the current yield on this bond?

$$\begin{aligned} \text{CY} &= \frac{100}{975} \times 100 \\ &= 10.26\% \end{aligned}$$

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There are over 50 pages in this workbook, full of demonstration learning examples designed to help you refresh and master the key financial concepts you need to know for the QAFP exam and the CFP exam.

And remember.....as one of Prof. Gordon's students you are never studying alone....it's like having your personal study coach standing ready to provide you with study support when you need it!

We hope you have a better idea of how this workbook can help add critical points to your exam score pushing you over the passing mark!

If you would like to access the remaining pages, [just click on this link to complete the process.](#)

Wishing you Exam Success!

## **Instructor/Author Profile:**



**Brian Y. Gordon, CFA, CFP, CIM, MBA, FCSI**, is a former tenured Professor in the School of Business at Centennial College in Toronto where he taught Economics, Financial Accounting, Corporate Finance, the Canadian Securities Course, Personal Financial Planning and Investment Management.

Prof. Gordon is also a part-time faculty member at Concordia University in Montreal, where he teaches Economics and Investment Management courses at the MBA level.

Prof. Gordon has also lectured at Ryerson University in Toronto teaching Corporate Finance.

Since 1999, Prof. Gordon has been a featured lecturer and workshop facilitator for CFP® and CFA® review programs offered across Canada.

Prior to entering academia, Prof. Gordon developed his expertise in the discount brokerage, full service brokerage and banking industries, specializing in investment management, business development, strategic sales and marketing, and wealth management training.

Prof. Gordon holds a BA in Economics from the University of Toronto, an MBA from Heriot-Watt University in the UK, and was awarded his CFA charter in 1999. In 1995, Prof. Gordon was granted a fellowship from the Canadian Securities Institute, earning the prestigious FCSI designation.

Prof. Gordon successfully challenged the CFP Professional Proficiency Examination and was awarded the right to use the CFP designation in 2005.