

## MBA Math Quantitative Skills Course Topics (24 Lessons)

The MBA Math course covers 24 modular topics, each with its own quizzes and learning materials.

- **Pre-Quiz:** You start with a pre-quiz on a particular topic to establish your starting point. For some topics, your pre-quiz score may well be a big fat zero! There is no reason that you would know about regression, for example, until you have studied it.
- **Study:** Guided by your pre-quiz score, you then work through the teaching material and exercises until you understand how to solve problems accurately.
- **Post-Quiz:** You take a post-quiz when you are ready. If you are not satisfied with your post-quiz score, you can continue your studying and then take another post-quiz. As many times as you need to attain the proficiency you desire.

### - Excel Spreadsheets (1 lesson)

**Basic Excel worksheet techniques** are covered in one topic with beginner and intermediate narrated lectures that provide the Excel foundation that you will extend through the rest of the course. Additional topic-specific techniques are used in lessons covering the MBA topics below. Solutions illustrate basic functions implementing algebraic formulas and also the **built-in functions (e.g., FV, NPV, VAR, STDEV, CORREL, RSQ, NORMDIST)** that you will use most often in your MBA experience.

### - Financial Math (6 lessons)

Familiarity with time value of money concepts, formulas, and spreadsheet solution techniques should be considered a prerequisite for your MBA experience. Because everything else in financial math is built on this foundation of **shifting one cash payment at one time to its equivalent at another time**, you should be clear about this before you start.

**Annuities and perpetuities** are the simplest smooth patterns of cash flows over time.

**Bonds** are a mixture of annuities and future values.

**Net present value** allows you to convert an irregular set of cash flows back to the present to compare one course of action with another. Such problems appear throughout the MBA curriculum.

- Time Value of Money (2 lessons)
  - Annual Compounding
    - Present Value
    - Rate
    - Number of Periods
    - Future Value
  - Sub-Annual Compounding
    - same as Annual plus:
    - Periods per Year
- Annuities and Perpetuities (2 lessons)
  - Constant
  - Growing
- Bond Basics (1 lesson)
  - Zero Coupon
  - Coupon
- Net Present Value (1 lesson)

## - Accounting (7 lessons)

Making sense of accounting requires a clear understanding of the three main financial statements and how these statements represent standard business transactions. The math is simple. The challenge lies in the logic, definitions, and conventions. Using Intel's financial statements as an example, you learn the basics about the **balance sheet, income statement, and statement of cash flows**.

After studying each financial statement separately, you then work on the **connections among the three statements** with a set of examples.

You use the **balance sheet equation and t-accounts** to characterize standard business transactions in terms of offsetting **debits and credits**. Finally, you apply what you learned with t-accounts to make appropriate **journal entries**.

- Balance Sheet (2 lessons)
  - Assets
  - Liabilities
  - Equity
  - Balance Sheet Equation
  - Transactions
- Income Statement (1 lesson)
  - Revenues
  - Expenses
  - Cash vs. Depreciation
- Statement of Cash Flows (1 lesson)
  - Operating Activities
  - Investing Activities
  - Financing Activities
  - Cash vs. Depreciation
- Statement Connections (1 lesson)
- T Accounts and Balance Sheet Equation (1 lesson)
  - Balances
  - Debits
  - Credits
  - Transactions
- Journals (1 lesson)
  - Journal Entry Template
  - Debits
  - Credits
  - Transactions

## - Microeconomics (3 lessons)

**Marginal analysis** addresses the question of how much to produce to maximize profit, given specified costs and revenues. Problem statements and solutions involve either tables or formulas. You learn to distinguish among marginal, total, and average costs and revenues.

**Supply and demand** are the classic economics concept. You learn to create and interpret the classic linear "curves", compute the **equilibrium point** that maximizes profit and the corresponding **consumer surplus**. You examine market segmentation, and use demand curves as part of marginal analysis.

- Marginal Analysis (2 lessons)
  - Tables
  - Formulas and Calculus
- Supply and Demand (1 lesson)

## - Statistics and Probability (7 lessons)

You start with **basic summary statistics**, which form the foundation. You then tackle statistics of linear combinations, which is a fancy way of saying **stock portfolios**.

Tables and graphs summarize raw data. You need to know how to make them and work with them.

**Regression** allows you to draw a best-fit line through a set of data points. You can do it visually or computationally. Both approaches are a snap using Excel.

The **standard normal "bell curve"** is the king of continuous distributions. You learn to work with continuous distributions in terms of intervals rather than points. Excel makes solutions a breeze but you may, depending on your MBA program, need to learn the z-table approach and its corresponding pictographs and conversions.

Sampling and inference extend the normal distribution to the Central Limit Theorem, confidence intervals and hypothesis testing.

- Basic Summary Statistics (1 lesson)
  - Mean, Median, and Mode
  - Variance and Standard Deviation
- Linear Combinations (e.g., Stock Portfolios) (1 lesson)
  - Covariance and Correlation
  - Portfolio Statistics from Individual Stock Returns
  - Portfolio Statistics from Individual Stock Statistics
- Discrete Probability Distributions (1 lesson)
- Linear Regression (1 lesson)
  - Regression Line Equation
  - Prediction
  - Measure of Linearity
- Continuous Distributions (1 lesson)
  - Uniform
  - Standard Normal
  - Normal
- Sampling (Central Limit Theorem) (1 lesson)
- Inference (1 lesson)
  - Confidence Intervals
  - Hypothesis Testing