

## Mathematics of Personal Finance

**Prerequisite: Currently enrolled in or successful completion of Secondary Math II**

Mathematics of Personal Finance is designed for students in their junior or senior year of high school. The course represents content from mathematics and personal finance that are essential for students who will assume roles as consumers, money managers and members of a global workforce. Successful completion of all four quarters of this course will fulfill 1 credit of supplemental mathematics requirements.

**Standard I: Students will use number sense, perform operations, solve problems and make decisions using rational and irrational numbers to set and implement financial goals.**

**Objective 1: Determine, represent and analyze mathematical models and formulas for various types of financial calculations.**

- a. Use financial formulas that require operations with real numbers.
- b. Interpret the meaning of integers in financial situations.
- c. Use the irrational number  $e$  to evaluate continuously compounded interest.
- d. Calculate net and gross income.

**Objective 2: Analyze financial plans and calculated costs of personal finance.**

- a. Describe the value and use of savings in financial planning.
- b. Explain how government regulations protect savers.
- c. Compare the risk, return, liquidity, and costs for savings and investments.
- d. Describe the value of investing and types of investments in the financial planning process.
- e. Explain the effects of inflation on savings and investments.
- f. Analyze the relationship between risk and return.
- g. Describe and select appropriate financial products for different financial goals.

**Objective 3: Complete calculations associated with personal finance and financial planning using technology.**

- a. Calculate future value of investments and present value of investments.
- b. Calculate stock market transaction fees, stock splits and dividend income.
- c. Compute monthly payments for loans of different types.
- d. Determine the required time to pay off loans.
- e. Compute the anticipated earnings for investments and savings plans.
- f. Compute average daily balances on loans and investments.

### Mathematical and Financial Language and Symbols Students Should Use

decimals, percent, exponent, rate, rational numbers, irrational numbers, integers, , estimate, net, gross, exempt, deductions, FICA, graduated commission, adjustments, APR (fixed vs. variable), annual fees, 52 week high and low, percent change, simple moving average, arithmetic average, weekly, bi-weekly, semi-monthly, monthly, capital gain/loss, commission, CD, bonds, stocks, mutual funds, premium, future value, deductibles, co-payments, withholdings, expenditures, balances, investments

**Exploratory Concepts and Skills**

- NASDAQ
- NYSE
- S & P
- Dow Jones
- Tax Forms

**Standard II: Students will use graphs, charts and tables for financial decision-making and planning.**

**Objective 1: Summarize and interpret information from graphs, tables and charts.**

- a. Create and interpret scatter plots, line graphs, bar graphs, circle graphs, histograms, and pictographs associated with finances.
- b. Use regression to interpolate and extrapolate data associated with finances.
- c. Use charts, tables and graphs to identify and track fixed and variable expenses and assets.
- d. Use spreadsheets to evaluate data.
- e. Interpret stock market data charts.

**Objective 2: Solve problems using graphical representations**

- a. Represent the value of an employee benefit package graphically.
- b. Compare different employee benefit packages in the same job.
- c. Compare different employee benefit packages in different jobs.
- d. Analyze graphs displaying various interest rates on returns of investment.
- e. Graph the costs of various aspects of renting a home vs. purchasing a home.
- f. Graph the growth of different long term investments and income earnings.
- g. Graph linear and exponential functions associated with finance.

**Mathematical and Financial Language and Symbols Students Should Use**

plots, interpolate, extrapolate, data, information, charts, graphs, regression, benefit packages, bankruptcy, amortization charts, tax tables

**Exploratory Concepts and Skills**

- Creating plots.
- Regressions
- Evaluation of when to use different types of graphs

**Standard III: Students will use algebra associated with personal finances.**

**Objective 1: Analyze monthly, annual, and life-long financial plans.**

- a. Compare time and costs required to pay off a loan compared to saving for a purchase.
- b. Compute monthly net and gross earnings based on various earning possibilities.

## Utah Mathematics of Personal Finance

- c. Compute annual net and gross earnings based on various earning possibilities.
- d. Calculate present and future investment values.
- e. Use algebraic functions to calculate average daily balances on loans and investments.

### **Objective 2: Work with functions associated with finance and financial planning.**

- a. Interpret the rate of change of functions associated with financial planning.
- b. Represent financial scenarios with linear and non-linear functions.
- c. Use functions to make predictions for future financial values.
- d. Distinguish between financial contexts that result in linear and non-linear functions.

### **Objective 3: Determine, represent and analyze relationships for various types of growth and decay models.**

- a. Compute depreciation problems that involve exponential decay.
- b. Compute inflation problems that involve exponential growth.
- c. Identify growth and decay situations from real world problems.
- d. Calculate purchasing power.

#### **Mathematical and Financial Language and Symbols Students Should Use**

Function, linear, non-linear, extrapolate, rate, average, stock splits, dividend income, earnings, exponential growth, exponential decay

#### **Exploratory Concepts and Skills**

- Explore national debt projections
- Calculate income and taxes for a vocation in which they are interested

### **Standard IV: Students will use rational decision making for financial planning.**

#### **Objective 1: Create, represent and justify personal monthly and yearly budgets.**

- a. Create spreadsheets, tables, or charts that represent personal income and expenses.
- b. Design a plan to reach a specific financial goal.
- c. List advantages of designing and following a personal financial plan.
- d. Analyze the role of cultural, social, and emotional influences on financial behavior.

#### **Objective 2: Relate financial decisions to personal and societal consequences.**

- a. Recognize that individuals are responsible for their finances.
- b. Describe the social and economic consequences of bankruptcy.
- c. Describe the consequences of excessive debt including increased consumer costs, inflation, and family instability.
- d. Evaluate the role of emotions when making financial decisions.

#### **Objective 3: Research annual earnings for various employment opportunities in the job market to make mathematical decisions for personal income.**

- a. Create budgets for various earning opportunities including fluctuations in income.
- b. Follow and explain the earnings or losses associated with a given investment in the market.

- c. Collect, organize and interpret data associated with utilities, cash flow, housing, food, entertainment, medical, and transportation expenses.
- d. Compare various vehicles for attaining short-term and long-term financial goals.

**Mathematical and Financial Language and Symbols Students Should Use**  
decimals, percent, exponent, rate, compound interest, interpolate, extrapolate, mean, median, mode, estimate, variable rate of change, constant rate of change, total, simple interest, units, gains, losses, variance, consumer costs, inflation, fluctuations,

**Exploratory Concepts and Skills**

- Creating spreadsheets and data tables.
- Writing and evaluating formulas
- Extrapolating data, interpolating data.
- Writing programs for predicting future values

**Standard V: Students will understand and explain the relationship between income sources and career preparation.**

**Objective 1: Identify various forms of income and analyze factors that affect income.**

- a. Identify sources of income.
- b. Compare common employee benefits.
- c. Compare income to the cost-of-living in various geographical areas.
- d. Analyze how economic conditions affect income.

**Objective 2: Identify and understand required income withholdings.**

- a. List the reasons for taxation and uses of tax revenues.
- b. Describe the purposes of Social Security and Medicare.
- c. Identify wages and withholding on an employee payment record.
- d. Demonstrate how to complete personal state and federal income tax forms.

**Objective 3: Analyze criteria for selecting a career and the impact of career choices on income and financial stability.**

- a. Describe the correlation between income and a worker's skills, education, the value of the work to society, condition of the economy, and the supply and demand for workers.
- b. Develop career plans that include educational requirements, skill development, and income potential.
- c. Analyze the costs and benefits of obtaining additional education or developing new skills for the workplace.
- d. Identify the risks and rewards of entrepreneurship/self-employment.

**Mathematical and Financial Language and Symbols Students Should Use**  
Wages, investments, self-employment, leave, retirement, cost-of-living, economic effect, entrepreneur,

**Exploratory Concepts and Skills**

- Creating spreadsheets.
- Compare early retirement benefits to full retirement benefits of Social Security
- Create case studies of income earnings for various careers

**Standard VI: Students will use principles of money management.**

**Objective 1: Describe the role of planning and maintaining a balanced budget.**

- Develop, monitor, and evaluate a personal budget.
- Discuss opportunity costs and trade-offs on budget implementation.
- Identify and discuss the social and personal consequences of not following a budget.
- Compare and evaluate various tools available for keeping track of budgets.
- Demonstrate knowledge of financial transactions, checking and savings accounts associated financial services.
- Demonstrate how to manage a checking account.
- Evaluate the impact of major purchases on budgeting.

**Objective 2: Understand credit uses and costs.**

- Discuss the history and role of credit.
- List basic types of credit.
- Describe the risks and responsibilities associated with using credit.
- Identify methods of establishing and maintaining a good credit rating.
- Explain the purpose of co-signers and collateral when applying for a loan.
- Identify warning signs of credit abuse and ways to correct credit problems.
- Calculate and compare costs associated with the use of credit.
- Calculate how long it takes to repay debt and the total costs when a borrower makes minimum payments.

**Objective 3: Describe the impact of credit on money management.**

- Compare the advantages and disadvantages of different payment methods.
- Compare the services of various types of financial institutions and identify advantages of comparison shopping before selecting financial services.
- Describe the relationship between a credit rating and the cost of credit and factors that affect credit worthiness.
- Explain the value of credit reports and scores to borrowers and lenders.

**Objective 4: Describe the rights and responsibilities of buyers and sellers under consumer protection laws.**

- Explain the purposes and features of consumer protection laws, agencies and sources of assistances.
- Describe ways to avoid identity theft and fraud.
- Explain the importance of understanding financial contracts.
- List possible actions a consumer can take in response to excessive debt and collection practices.
- Describe ways to avoid financial scams and schemes designed to defraud consumers.

**Objective 5: Discuss the purposes for insurance and risk management.**

- a. Identify common types of insurance and their terminology.
- b. Describe how insurance and other risk-management strategies protect against financial loss.
- c. Discuss insurance needs at various life stages.
- d. Identify the importance of estate planning.
- e. Discuss the consequences of being under-insured.

**Mathematical and Financial Language and Symbols Students Should Use**

Insurance, auto insurance, health insurance, renter's insurance, homeowners insurance, long term disability, term, whole life, deductible, premium, grace period, wills, trusts

**Exploratory Concepts and Skills**

- Estate planning
- Comparison shopping for insurance
- Exploring risk management sources