



Western Technical College

## 10804123 Math with Business Applications

### Course Outcome Summary

#### Course Information

<b>Description</b>	This course covers real numbers, basic operations, linear equations, proportions with one variable, percents, simple interest, compound interest, annuity, apply math concepts to the purchasing/buying process, apply math concepts to the selling process, and basic statistics with business/consumer applications.
<b>Instructional Level</b>	Associate Degree Courses
<b>Total Credits</b>	3
<b>Total Hours</b>	54

#### Textbooks

*Contemporary Mathematics for Business & Consumers – with Access*. 9th Edition. Copyright 2020. Brechner, Robert and George Bergeman. Publisher: Cengage Learning. **ISBN-13:** 978-0-357-02649-6. Required.

#### Learner Supplies

Scientific calculator - \$10-20. **Vendor:** Campus Shop. Required.

#### Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Live Responsibly: Develop Resilience
3. Live Responsibly: Foster Accountability
4. Refine Professionalism: Improve Critical Thinking

#### Course Competencies

1. **Solve scenarios using basic math computations.**

##### Assessment Strategies

- 1.1. Math Assessment with Consumer/Business Applications

##### Criteria

*You will know you are successful when*

- 1.1. you use real numbers and basic operations to solve business/consumer problems.
- 1.2. you answer with the precision of terms appropriate to the problem.
- 1.3. you answer in the correct units of measure and labels.

#### **Learning Objectives**

- 1.a. Apply basic operations to whole numbers, fractions and decimals.
- 1.b. Translate business/consumer problems to mathematical processes.
- 1.c. Apply the correct operation to business scenarios which apply whole numbers, fractions, & decimals.
- 1.d. Identify units and labels within a business/consumer problem.
- 1.e. Convert to appropriate units where needed.
- 1.f. Identify place value.
- 1.g. Round to the appropriate place value.

## **2. Solve scenarios using algebraic concepts.**

#### **Assessment Strategies**

- 2.1. Math Assessment with Consumer/Business Applications

#### **Criteria**

*You will know you are successful when*

- 2.1. you identify the unknown with the appropriate variable.
- 2.2. you write the equation that relates the known information with the appropriate variable.
- 2.3. you evaluate formulas for given value of the variables.
- 2.4. you use algebra to solve business/consumer scenarios.
- 2.5. you perform basic operations with signed numbers.
- 2.6. you employ the order of operations to simplify an expression.
- 2.7. you rearrange formulas to solve for a specific variable.
- 2.8. you solve linear equations.
- 2.9. you solve proportions.
- 2.10. you answer with the precision of terms appropriate to the problem.
- 2.11. you answer in the correct units of measure and labels.

#### **Learning Objectives**

- 2.a. Identify the unknown quantity within a consumer/business scenario.
- 2.b. Interpret written expressions in mathematical symbols.
- 2.c. Translate business/consumer problems to mathematical equations/expressions.
- 2.d. Simplify linear mathematical expressions.
- 2.e. Implement the algebraic properties of equality on linear equations.
- 2.f. Apply basic operations to signed numbers.
- 2.g. Apply the correct order of operations when evaluating numerical expressions.
- 2.h. Evaluate mathematical expressions for given values.
- 2.i. Identify a scenario as a proportion.
- 2.j. Relate a scenario as a proportional equation.
- 2.k. Apply the means-extremes theorem (cross multiplication) to solve a proportion.

## **3. Solve percentage scenarios.**

#### **Assessment Strategies**

- 3.1. Math Assessment with Consumer/Business Applications

#### **Criteria**

*You will know you are successful when*

- 3.1. you convert between percents, decimals, fractions.
- 3.2. you identify the base, rate, and amount in the problem.
- 3.3. you compute the base, rate, or amount.
- 3.4. you use percentages to solve business/consumer scenarios.
- 3.5. you solve percent increase/decrease scenarios.
- 3.6. you answer with the precision of terms appropriate to the problem.
- 3.7. you answer in the correct units of measure and labels.

### Learning Objectives

- 3.a. Convert fractions to decimals and decimals to fractions.
- 3.b. Convert decimals to percents and percents to decimals.
- 3.c. Convert fractions and mixed numbers to percents and percent to fractions and mixed numbers.
- 3.d. Identify the base, rate and portion in a business application or scenario.
- 3.e. Compute the base, rate and portion in a business application or scenario.
- 3.f. Identify the amount of increase or decrease in a business application or scenario.
- 3.g. Compute the percent increase or decrease in a business application or scenario.
- 3.h. Compute the base in a percent increase or decrease scenario.
- 3.i. Compute the portion in a percent increase or decrease scenario.

## 4. Solve simple interest scenarios.

### Assessment Strategies

- 4.1. Math Assessment with Consumer/Business Applications

### Criteria

*You will know you are successful when*

- 4.1. you identify the characteristics of simple interest.
- 4.2. you compute principal, rate, or time using simple interest formula.
- 4.3. you determine due date of a promissory note.
- 4.4. you compute maturity value, principal, rate, and time using maturity value formula.
- 4.5. you determine present and future values.
- 4.6. you determine the maturity value of a note in which partial payments are made.
- 4.7. you determine the proceeds of a discount note.
- 4.8. you determine effective rate of a discount note.
- 4.9. you determine the proceeds of a note that is discounted before maturity.
- 4.10. you use simple interest to solve business/consumer scenarios.
- 4.11. you answer with the precision of terms appropriate to the problem.
- 4.12. you answer in the correct units of measure and labels.

### Learning Objectives

- 4.a. Identify principal, rate, time and simple interest in a business problem or scenario.
- 4.b. Apply the simple interest formula to compute principal, rate, time or simple interest in a business problem or scenario.
- 4.c. Identify the loan date and due date on a promissory note.
- 4.d. Identify the time of a promissory note in days, weeks, and months.
- 4.e. Calculate the loan date, the due date of a note or the time of the loan, given two of the three pieces.
- 4.f. Relate maturity value to principal and simple interest.
- 4.g. Apply the maturity value formula to compute principal, rate, time, interest or maturity value in a business problem or scenario.
- 4.h. Identify present value and future value in a business problem or scenario.
- 4.i. Compare present value to future value in a business problem or scenario.
- 4.j. Calculate the new maturity value of a loan when partial payments are made
- 4.k. Calculate the bank discount and proceeds of a discount note.
- 4.l. Calculate the effective rate.
- 4.m. Determine the length of the discount period.
- 4.n. Apply the correct process to calculate the proceeds of a note that is discounted before maturity.

## 5. Solve compound interest scenarios.

### Assessment Strategies

- 5.1. Math Assessment with Consumer/Business Applications

### Criteria

*You will know you are successful when*

- 5.1. you identify the characteristics of compound interest.
- 5.2. you differentiate between simple and compound interest.
- 5.3. you determine the number of periods.
- 5.4. you determine the rate per period.
- 5.5. you compute compound interest and compound amount.

- 5.6. you determine present and future values.
- 5.7. you use compound interest formulas to solve business/consumer scenarios.
- 5.8. you determine the APY and the APR.
- 5.9. you answer with the precision of terms appropriate to the problem.
- 5.10. you answer in the correct units of measure and labels.

#### **Learning Objectives**

- 5.a. Identify the growth of compound interest over time.
- 5.b. Compare the growth of simple interest and compound interest over time.
- 5.c. Define the length of a single compound.
- 5.d. Identify the number of compounds in a single year.
- 5.e. Identify the annual interest rate.
- 5.f. Calculate the interest rate divided by the number of period in a year ( for the calculator)
- 5.g. Identify the correct formula for present value or future value of compound interest.
- 5.h. Differentiate between compound amount and compound interest and principal.
- 5.i. Calculate compound amount, compound interest and principal.
- 5.j. Apply the compound interest formula to compute the future value of an account and the interest in a business problem or scenario.
- 5.k. Apply the present value form of the compound interest formula to compute the present value and/or the interest in a business problem or scenario.

### **6. Solve annuity scenarios.**

#### **Assessment Strategies**

- 6.1. Math Assessment with Consumer/Business Applications

#### **Criteria**

*You will know you are successful when*

- 6.1. you identify the characteristics of an annuity.
- 6.2. you differentiate between the present and future value of an annuity.
- 6.3. you calculate the amount of a sinking fund payment.
- 6.4. you calculate the present and/or future values of an annuity.
- 6.5. you apply annuity calculations to business/consumer scenarios.
- 6.6. you answer with the precision of terms appropriate to the problem.
- 6.7. you answer in the correct units of measure and labels.

#### **Learning Objectives**

- 6.a. Determine the number of periods.
- 6.b. Determine the period rate.
- 6.c. Determine the difference between future and present values.
- 6.d. Determine the total amount invested.
- 6.e. Determine the difference between amortization payments and sinking fund payments.
- 6.f. Identify if the scenario calls for finding payments over time or a lump sum.
- 6.g. Determine the appropriate formula for the given business problem or scenario.
- 6.h. Apply the appropriate formula to determine the Future value, Present value, Sinking fund payment, and Amortization payment in a business problem or scenario.
- 6.i. Determine the total amount of interest earned or paid in.

### **7. Apply math concepts to the purchasing/buying process.**

#### **Assessment Strategies**

- 7.1. Math Assessment with Consumer/Business Applications

#### **Criteria**

*You will know you are successful when*

- 7.1. you calculate trade discounts.
- 7.2. you calculate net price.
- 7.3. you differentiate between single and series discounts.
- 7.4. you express a series discount as a single discount equivalent.
- 7.5. you determine cash discount period.
- 7.6. you compute a cash discount.
- 7.7. you compute partial payment credit.

- 7.8. you solve business/consumer scenarios involving the purchasing/buying process.
- 7.9. you answer in the correct units of measure and labels.
- 7.10. you answer with the precision of terms appropriate to the problem.

#### **Learning Objectives**

- 7.a. Identify who gets and gives trade discounts and when they are used.
- 7.b. Identify the difference between a trade discount and net price.
- 7.c. Determine the appropriate formula or percentages to use in the business problem or scenario for finding trade discount amount, net price, the trade discount rate, and list price for a single trade discount.
- 7.d. Utilize the appropriate formula or percentages to calculate the trade discount , the net price, the list price and the trade discount rate for a single trade discount.
- 7.e. Calculate the net price factor for a single or series of discounts.
- 7.f. Determine the appropriate formula or percentages to use in the business problem or scenario for finding trade discount amount, net price, the single equivalent discount rate, and list price for a series of trade discounts.
- 7.g. Utilize the appropriate formula or percentages to calculate the trade discount , the net price, the list price and the single equivalent discount rate for a series of trade discounts.
- 7.h. Determine if a cash discount is applicable for the business scenario.
- 7.i. Calculate the amount due after a cash discount is applied.
- 7.j. Determine the amount of credit given for a partial payment in a cash discount scenario.
- 7.k. Determine the discount dates and net dates for ordinary, EOM, ROG, and Extra terms of sale.

### **8. Apply math concepts to the selling process.**

#### **Assessment Strategies**

- 8.1. Math Assessment with Consumer/Business Applications

#### **Criteria**

*You will know you are successful when*

- 8.1. you distinguish between markup based on cost and markup based on selling price.
- 8.2. you compute selling price, cost, or markup based on cost
- 8.3. you compute selling price, cost, or markup based on selling price.
- 8.4. you compute sale price, markdown, or original price.
- 8.5. you solve business/consumer scenarios involving the selling process.
- 8.6. you answer in the correct units of measure and labels.
- 8.7. you answer with the precision of terms appropriate to the problem.

#### **Learning Objectives**

- 8.a. Identify if the problem is using a markup based on cost or a markup based on selling price.
- 8.b. Calculate using the appropriate formulas or percentages the amount of markup, the markup percent, the cost, and the selling price for a markup based on cost scenario.
- 8.c. Calculate using the appropriate formulas or percentages the amount of markup, the markup percent, the cost, and the selling price for a markup based on selling price scenario.
- 8.d. Convert a percent markup based selling price to a markup based on cost and vice versa.
- 8.e. Identify the difference between a markup and a markdown.
- 8.f. Calculate using the appropriate formula or percentages the amount of markdown, the sale price, the original price and the markdown percent in a business problem or scenario.
- 8.g. Calculate the sale price after a series of markups and markdowns.
- 8.h. Calculate the selling price of a perishable goods.

### **9. Interpret basic statistics.**

#### **Assessment Strategies**

- 9.1. Math Assessment with Consumer/Business Applications

#### **Criteria**

*You will know you are successful when*

- 9.1. you interpret charted data.
- 9.2. you construct charts/graphs.
- 9.3. you determine the appropriate chart given the raw data.
- 9.4. you calculate measures of central tendencies.
- 9.5. you interpret measures of dispersion.

- 9.6. you determine the probability of an event involving normally distributed data.
- 9.7. you use statistics to solve business/consumer scenarios.
- 9.8. you answer with the precision of terms appropriate to the problem.
- 9.9. you answer in the correct units of measure and labels.

**Learning Objectives**

- 9.a. Use graphical data to gather information.
- 9.b. Identify the best chart to be used in certain business scenarios.
- 9.c. Create bar, circle, and line graphs from raw data.
- 9.d. Create a frequency table from raw data.
- 9.e. Calculate the mean, median, and mode of data.
- 9.f. Calculate the mean of grouped data.
- 9.g. Calculate a weighted mean (such as GPA) using business scenarios.
- 9.h. Calculate range, variance, and standard deviation.
- 9.i. Use the normal curve (z-scores) or empirical rule to determine probabilities, percentages and amounts in a business scenario.