

## BUSINESS MATH INSTRUCTOR'S SUMMARY

<b>Title:</b>	Business Math
<b>Hours:</b>	12 hours
<b>Description:</b>	Business Math is designed to provide members with a review and practice of rudimentary math skills as well as demonstrate the mathematics used in specific business practices. The members will also gain knowledge of simple graphs and the use of Excel® spreadsheets.
<b>Objectives:</b>	After completing this course, members will have refreshed their existing math skills and learned business applications for their basic math skills. They will also demonstrate how/when/why to use graphs and a basic understanding and practical application of using Excel®. The objectives of the module will be accomplished through in-class exercises combined with guidance and direction from the instructor.
<b>Materials:</b>	A marker board or chalk board, a course outline, a calculator, in-class exercises, handouts and graph paper (optional).
<b>Implementation:</b>	Many members fear math. Just the word “math” can send some folks into orbit! Therefore, it is important to maintain a classroom environment that is non-threatening. To keep the members at ease, inform them that the quizzes are “open-book” and “open-note.” Inform them that knowing how and when to use their math skills is the goal, rather than memorizing math rules. It is important to involve all members in group in-class exercises, not just members that volunteer. In fact, it is a requirement for certification for each member to answer at least one question correctly on every topic during the in-class exercises. The instructor should make use of handouts, a marker or chalkboard and in-class exercises to teach the content for this course. Make this a fun course!
<b>Topics:</b>	Basic Mathematics functions review Rounding/Estimation Decimals (add, subtract, multiply, divide) Simple Fractions (add, subtract, multiply, divide) Changing fractions to decimals and percents Changing decimals to fractions and percents Business word problems (markup and markdown, quantity discounts, counting money, manufacturing) Solving Financial Tasks with Excel® Spreadsheets Line and bar graphs

**BM4**

**Revision 8.1**

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**Certification  
Requirements:**

Score 80% or higher on the Business Math Module Online Quiz  
Master all competencies for Business Math (see BM6)  
Score 80% or higher on the Work Certified™ Certification Exam

Note: Each component of a business math topic (i.e. adding fractions and subtracting fractions) has its own in-class exercise and is considered a separate topic as it relates to answering a minimum of one question correctly in class.

**BM5**

**Revision 8.1**

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## BUSINESS MATH COMPETENCIES

BM-48. Answer a minimum of one question correctly on each topic during class discussion and exercise review.

BM-49. Demonstrate ability to create graphs by creating a line and bar graph in class with no errors as evidenced by product review.

BM-50. Demonstrate knowledge of Business Math basics by achieving a score of 80% or higher on an online quiz.

**BM6**

**Revision 8.1**

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# **BUSINESS MATH COURSE OUTLINE**

## **LESSON 1**

Course Introduction/Competency Requirements  
Basic Math Review  
Rounding/Estimation  
Multiply, Divide, Add, and Subtract Decimals

## **LESSON 2**

Multiply, Divide, Add, Subtract Simple Fractions  
Multiply, Divide, Add, Subtract Complex Fractions  
Changing Fractions to Decimals and Decimals to Fractions  
Systems of Measurement

## **LESSON 3**

Word Problems: Markup and Markdown  
Word Problems: Quantity Discounts  
Word Problems: Counting Money  
Word Problems: Manufacturing

## **LESSON 4**

Solving Financial Tasks with Excel® Spreadsheets  
Graphs  
Graph Exercise

Business Math Module Online Quiz

**\* NOTE: MAKE EACH STUDENT A COPY OF THE BUSINESS MATH STUDY GUIDE HANDOUT (BM60) FOR USE THROUGHOUT COURSE MODULE.**

## BUSINESS MATH TEACHING PLAN OVERVIEW LESSON 1

This lesson plan is for two hours. Take two 10-minute breaks at appropriate times.

TOPIC	TIME	COPIES REQUIRED as HANDOUTS
Course Outline & Competency Requirements	10-15 minutes	Competencies - page BM6 Course Outline - page BM7
Basic Math Exercises	20-30 minutes	Basic Math Exercises – page BM11
Rounding/Estimation	20-30 minutes	Rounding/Estimation Overview - page BM13 Rounding/Estimation Exercise - page BM15
Decimals	75 - 95 minutes	Add/Subtract Decimals Exercise – page BM17 Multiply/Divide Decimals Exercise - page BM19

**\* NOTE: MAKE EACH STUDENT A COPY OF THE BUSINESS MATH STUDY GUIDE HANDOUT (BM60) FOR USE THROUGHOUT COURSE MODULE.**

## BUSINESS MATH TEACHING PLAN LESSON 1

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Course Outline & Competency Requirements	Competencies- page BM6 Course Outline- page BM7	N/A	Review material on these documents

**INSTRUCTOR NOTES:**

1. Make sure you go over all competency requirements for this module with the members. Inform the members that the quizzes will all be open note tests.
2. Let them know that they will each be required to perform at least one example correctly for every topic covered in class during the class discussions (part of competency requirement) and that you are confident that everyone will be able to accomplish this.

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Basic Math Exercises	Basic Math Exercises - page BM11	Page BM12	Review basic addition, subtraction, multiplication and division by using the examples in the exercise.

**INSTRUCTOR NOTES:**

1. You may need to add to the exercises on the handout with some easy ones you create in class yourself to be sure that every member answers at least one question correctly during this lecture.
2. This content is a **warm-up** since all members were required to pass the pre-assessment test, which is the same as this topic.

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Rounding/Estimating Numbers	Rounding/Estimating Numbers Exercise - page BM13-15	Page BM16	Review the handout to demonstrate the useful purpose of rounding and estimating numbers. Demonstrate the differences, however slight, in rounding and estimating. Practice these rules with the exercises that follow your overview handout.

**INSTRUCTOR NOTES:**

1. In business, as well as in managing your own personal finances, rounding and estimating can be useful in projecting costs and/or budgeting.
2. In the example where you are ordering supplies, the supplies must be ordered in the quantity given, these items cannot be broken up. For example, pens can only be ordered in boxes of 100.
3. Following examples of estimating discuss the importance of carefully identifying at what level to round numbers. For example, when estimating currency, it is often much easier to round to the nearest dollar.

**BM9**

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## BUSINESS MATH TEACHING PLAN

### LESSON 1

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Decimals	Add/Subtract Decimals Exercise - page BM17  Multiply/Divide Decimals Exercise - page BM19	Page BM18  Page BM20	Start with addition and subtraction. Perform the exercises on the right, and then use the Add/Subtract Decimals Exercise. After addition and subtraction, do multiplication and division. Explain the rules for determining the proper number of decimals for multiplication (add the total number in the problem) and how to set up a division problem (moving the decimals so that you are dividing by a whole number). Next, perform the exercises on the right, and then use the Multiply/Divide Decimals Exercise.

**INSTRUCTOR NOTES:**

You may need to add to the exercises to assure every member answers at least one question correctly during this lecture.

Addition:

$60.3 + 50.5 = 110.8$   
 $111.6 + 10.3 = 121.9$   
 $25.2 + 11.9 = 37.1$   
 $2.18 + 6.71 = 8.89$   
 $10.55 + 10.11 = 20.66$   
 $20.67 + 29.45 = 50.12$

Subtraction:

$100.7 - 50.2 = 50.5$   
 $11.9 - 9.3 = 2.6$   
 $20.1 - 9.9 = 10.2$   
 $70.75 - 30.45 = 40.3$   
 $106.88 - 57.67 = 49.21$   
 $46.23 - 45.94 = 0.29$

Multiplication:

$5.3 \times 5.0 = 26.5$   
 $10.5 \times 10.9 = 114.45$   
 $25.6 \times 11.1 = 284.16$   
 $10.33 \times 5.00 = 51.65$   
 $30.15 \times 50.10 = 1510.515$   
 $20.22 \times 40.44 = 817.6968$

Division:

$10.0 \div 2.5 = 4.0$   
 $113.4 \div 25.2 = 4.5$   
 $33.8 \div 6.5 = 5.2$   
 $48.84 \div 5.5 = 8.88$   
 $142.9575 \div 12.25 = 11.67$   
 $100 \div 0.33 = 303.03$  (rounded to two decimals)

**BM10**

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## BUSINESS MATH TEACHING PLAN OVERVIEW LESSON 2

This lesson plan is for three hours. Take two 10-minute breaks at appropriate times.

TOPIC	TIME	COPIES REQUIRED as HANDOUTS
Multiply, Divide, Add, Subtract Simple Fractions	45-60 minutes	Add/Subtract/Multiply/Divide Simple Fractions Exercises - page BM26
Multiply, Divide, Add, Subtract Complex Fractions	45-60 minutes	Add/Subtract/Multiply/Divide Complex Fractions Exercises - page BM28
Changing Fractions to Decimals and Decimals to Fractions Percentage Conversion Exercise Reviewing Systems of Measurement	45-60 minutes	System of Measurement Handout-page BM30 Decimal, Fraction and Percent Conversion Exercise - page BM31

**BM21**

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## BUSINESS MATH TEACHING PLAN LESSON 2

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Multiply, Divide, Add, Subtract Simple Fractions	Add/Subtract/ Multiply/Divide Simple Fractions Exercises - page BM26	Page BM27	Start with addition and subtraction of simple fractions. Then do multiplication and division of simple fractions.

### INSTRUCTOR NOTES:

You may need to add to the exercises below and on the handout with some easy ones you create in class yourself to be sure every member answers at least one question correctly during this lecture.

Rules:     Addition and subtraction: need common denominator then add or subtract top

              Multiplication: multiply top (numerator) and bottom (denominator)

              Division: flip the fraction you are **dividing** by (second fraction- on right) and treat it like a multiplication problem.

#### Simple fractions

Addition:

$$1/3 + 2/3 = 1$$

$$1/3 + 1/6 = 3/6 = 1/2$$

$$2/3 + 2/3 = 4/3 = 1 \frac{1}{3}$$

$$10/12 + 4/6 = 18/12 = 1 \frac{6}{12} = 1 \frac{1}{2}$$

Subtraction:

$$2/3 - 1/3 = 1/3$$

$$3/6 - 1/3 = 1/6$$

$$3/4 - 1/5 = 15/20 - 4/20 = 11/20$$

$$2/3 - 3/9 = 2/3 - 1/3 = 1/3$$

Multiplication:

$$1/3 \times 1/3 = 1/9$$

$$2/7 \times 3/5 = 6/35$$

$$4/5 \times 2/10 = 8/50 = 4/25$$

$$3/8 \times 6/7 = 18/56 = 9/28$$

Division:

$$1/3 \text{ divided by } 1/2 = 1/3 \times 2/1 = 2/3$$

$$2/5 \text{ divided by } 2/3 = 2/5 \times 3/2 = 6/10 = 3/5$$

$$10/12 \text{ divided by } 11/12 = 10/12 \times 12/11 = 120/132 = 60/66 = 30/33$$

$$1/8 \text{ divided by } 1/4 = 1/8 \times 4/1 = 4/8 = 1/2$$

$$3/10 \text{ divided by } 2/3 = 3/10 \times 3/2 = 9/20$$

$$4/25 \text{ divided by } 1/4 = 4/25 \times 4/1 = 16/25$$

**BM22**

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## BUSINESS MATH TEACHING PLAN

### LESSON 2

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Multiply, Divide, Add, Subtract Complex Fractions	Add/Subtract/ Multiply/Divide Complex Fractions Exercises - page BM28	Page BM29	Start with addition and subtraction of complex fractions. Then follow with multiplication and division of complex fractions.

#### INSTRUCTOR NOTES:

Complex fractions are fractions with a whole number, referred to as mixed numbers. You may need to add to the exercises below and on the handout with some easy ones you create in class yourself to be sure every member answers at least one question correctly during this lecture.

Rule: Turn complex fractions into simple fractions by multiplying whole number times the denominator of the fraction (bottom number) and adding the numerator of the fraction (top number). Then follow rules for simple fractions.

Addition:

$$1 \frac{3}{7} + \frac{6}{7} = \frac{10}{7} + \frac{6}{7} = \frac{16}{7} = 2 \frac{2}{7}$$

$$1 \frac{1}{3} + \frac{1}{3} = \frac{4}{3} + \frac{1}{3} = \frac{5}{3} = 1 \frac{2}{3}$$

Or you can add the whole numbers then add the fractions;

$$10 \frac{1}{3} + 5 \frac{5}{6} = 15 + \frac{1}{3} + \frac{5}{6} = 15 + \frac{2}{6} + \frac{5}{6} = 15 + \frac{7}{6} = 16 \frac{1}{6}$$

$$15 \frac{3}{32} + 22 \frac{9}{10} = 37 + \frac{3}{32} + \frac{9}{10} = 37 + \frac{30}{320} + \frac{288}{320} = 37 + \frac{318}{320} = 37 \frac{159}{160}$$

Subtraction:

$$\frac{5}{3} - \frac{1}{3} = \frac{4}{3} = 1 \frac{1}{3}$$

$$4 \frac{3}{5} - \frac{2}{5} = \frac{23}{5} - \frac{2}{5} = \frac{21}{5} = 4 \frac{1}{5}$$

Or you can subtract the whole numbers then subtract the fractions;

$$12 \frac{2}{3} - 6 \frac{1}{6} = 6 + \frac{2}{3} - \frac{1}{6} = 6 + \frac{4}{6} - \frac{1}{6} = 6 + \frac{3}{6} = 6 \frac{1}{2}$$

$$10 \frac{1}{5} - 5 \frac{1}{3} = 5 + \frac{1}{5} - \frac{1}{3} = 5 + \frac{3}{15} - \frac{5}{15} = 5 + (-)\frac{2}{15} = 4 \frac{15}{15} - \frac{2}{15} = 4 \frac{13}{15}$$

Multiplication:

$$\frac{2}{3} \times 4 = \frac{8}{3} = 2 \frac{2}{3}$$

$$2 \frac{2}{5} \times \frac{3}{5} = \frac{12}{5} \times \frac{3}{5} = \frac{36}{25} = 1 \frac{11}{25}$$

**Note:** you cannot multiply the whole numbers then the fractions and add them together;

Try it:  $6 \frac{2}{3} \times 3 \frac{2}{10} = 18 + \frac{2}{3} \times \frac{2}{10} = 18 + \frac{4}{30} = 18 \frac{2}{15}$  is **not the correct answer.**

$$2 \frac{1}{3} \times 2 \frac{1}{6} = \frac{7}{3} \times \frac{13}{6} = \frac{91}{18} = 5 \frac{1}{6}$$

Division:

$$\frac{1}{2} \text{ divided by } \frac{1}{3} = \frac{1}{2} \times \frac{3}{1} = \frac{3}{2} = 1 \frac{1}{2}$$

$$\frac{2}{3} \text{ divided by } \frac{2}{5} = \frac{2}{3} \times \frac{5}{2} = \frac{10}{6} = 1 \frac{4}{6} = 1 \frac{2}{3}$$

**Note:** You cannot divide the whole numbers then the fractions and add them together;

Try it:  $3 \frac{1}{3} \text{ divided by } 1 \frac{1}{3} = 3 + \frac{1}{3} \times \frac{1}{3} = 3 + \frac{1}{9} = 3 \frac{1}{9}$  is **not the answer.**

$$10 \frac{2}{8} \text{ divided by } 2 \frac{1}{4} = \frac{82}{8} \text{ divided by } \frac{9}{4} = \frac{82}{8} \times \frac{4}{9} = \frac{328}{72} = 4 \frac{40}{72} = 4 \frac{5}{9}$$

**BM23**

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## BUSINESS MATH TEACHING PLAN LESSON 2

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Changing Fractions to Decimals and Decimals to Fractions and Percentage Conversion Exercise  Reviewing Systems of Measurement	Decimal, Fraction, Measurement, Percent Conversion Exercise - page BM31  Systems of Measurement Handout- page BM30	Pages BM32	<p>Explain the rules below for changing fractions into decimals, decimals into fractions and decimals into percentages. Use the examples below and the Decimal, Fraction, Measurement, Percent Conversion Exercise.</p> <p>Review the Systems of Measurement Handout with the members. Explain how measurements are use in every day work places. Review place values and how to read a ruler. Discuss what type of occupations use the different types of measurements, such as: Truck drivers and freight handlers deal with weights. A retail clerk purchases products that are sold in gallons, liters, etc. Pharmacists deal with metric units of volume. Construction workers deal with units of length. Auto mechanics deal with metric units, etc. You may refer to websites that are more detailed in systems of measure if necessary.</p> <p>Websites:  <a href="http://www.metric-conversion-tables.com/autometricconversion.htm">http://www.metric-conversion-tables.com/autometricconversion.htm</a>  <a href="http://www.mcgees.com/kitchen/metric.htm">http://www.mcgees.com/kitchen/metric.htm</a></p>

**INSTRUCTOR NOTES:**

You may need to add to the exercises below and on the handout with some easy ones you create in class yourself to be sure every member answers at least one question correctly during this lecture.

**Rules:**

Fraction to decimals: divide the top number in the fraction (numerator) by the bottom number in the fraction (denominator). For example  $4/5 = 4$  divided by  $5 = 0.8$ .

Decimal to fraction: the number after the decimal over the whole number equivalent of the last decimal place that the fraction goes out to (i.e. 115 goes out to the thousandths so the fraction would be 115/1000).

Decimal to percent: multiply the decimal by 100 (i.e.  $0.5 \times 100 = 50\%$ )

Percent to decimal: divide the number by 100 (i.e.  $50\% = 50/100 = 0.5$ )

**BM24**

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# BUSINESS MATH TEACHING PLAN

## LESSON 2

### Decimals to fractions:

$$0.1 = 1/10$$

$$0.11 = 11/100$$

$$0.5 = 5/10 = 1/2$$

$$0.106 = 106/1,000 = 53/500$$

$$0.36 = 36/100 = 18/50 = 9/25$$

$$0.55009 = 55009/100,000$$

$$1.25 = 1 \frac{25}{100} = 1 \frac{1}{4}$$

$$2.6 = 2 \frac{6}{10} = 2 \frac{3}{5}$$

$$100.125 = 100 \frac{125}{1000} = 100 \frac{25}{200} = 100 \frac{5}{40} = 100 \frac{1}{8}$$

$$45.06 = 45 \frac{6}{100} = 45 \frac{3}{50}$$

$$11.009 = 11 \frac{9}{1000}$$

$$67.035 = 67 \frac{35}{1000} = 67 \frac{7}{200}$$

### Decimal to percent:

$$0.33 = 33\%$$

$$0.06 = 6\%$$

$$1.11 = 111\%$$

$$0.8675 = 86.75\%$$

$$12.2 = 1220\%$$

$$15.0375 = 1503.75\%$$

### Fractions to decimals:

$$1/2 = 1 \text{ divided by } 2 = 0.5$$

$$3/5 = 3 \text{ divided by } 5 = 0.6$$

$$12/50 = 12 \text{ divided by } 50 = 0.24$$

$$7/15 = 7 \text{ divided by } 15 = 0.47$$

(rounded to two decimals)

$$11/440 = 11 \text{ divided by } 440 = .025$$

$$20/12 = 20 \text{ divided by } 12 = 1.67 \text{ (rounded to two decimals)}$$

## BUSINESS MATH TEACHING PLAN OVERVIEW LESSON 3

This lesson plan is for three and a half hours. Take two 10-minute breaks at appropriate times.

TOPIC	TIME	COPIES REQUIRED as HANDOUTS
Calculator	10 minutes	Calculator Handout- page BM39
Business Word Problems - Markup and Markdown	40 - 50 minutes	Markup/Markdown Exercise - page BM40
Business Word Problems - Quantity Discounts	35 - 45 minutes	Quantity Discount Exercise - page BM43
Business Word Problems - Manufacturing	35 - 45 minutes	Manufacturing Exercise - page BM45
Business Word Problems - Counting Money	20 - 30 minutes	Counting Money Exercise - page BM47

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## BUSINESS MATH TEACHING PLAN

### LESSON 3

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Calculator	Calculator Handout- page BM39	N/A	Handout of basic tips for using a calculator. Review calculator functions.

**INSTRUCTOR NOTES:**

Review add, subtract, multiply and divide on the calculator.

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Business Word Problems -Markup and Markdown	Markup/ Markdown Exercise - page BM40	Page BM41-42	Explain that the next few topics are applied, practical uses for percentages. The first topic is a retail-related topic, markup and markdown. First, explain how markdown is used in retail. Then perform the exercises and be sure to cover the formulas. Next, explain how multiple discounts work. Then repeat the process for markup. After covering both markup and markdown, distribute and have the class perform the Markup/ Markdown Exercise.

**INSTRUCTOR NOTES:**

Markup

Exercises:

Your cost for shoes is \$10. What is your selling price if you want to make 100% on each shoe?  
 $\$10 + (\$10 \times 100\%) = \text{selling price. } \$10 + \$10 = \$20.$

Your cost for sofas is \$500. What is your selling price if you want to make 40% on each sofa?  
 $\$500 + (\$500 \times 40\%) = \text{selling price. } \$500 + \$200 = \$700.$

Your cost for TVs is \$100. What is your selling price if you want to make 75% on each TV?  
 $\$100 + (\$100 \times 75\%) = \text{selling price. } \$100 + \$75 = \$175.$

**BM34**

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## BUSINESS MATH TEACHING PLAN

### LESSON 3

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Business Word Problems -Quantity Discounts	Quantity Discount Exercise - page BM43	Page BM44	Talk about the differences between wholesale and retail. Wholesale is price that retail outlets purchase inventory (products). Retail is the price they charge customers who buy that merchandise. Explain how quantity discounts are used in retailing with wholesalers. Then, perform the exercises and be sure to cover the formulas. Distribute and have the class perform the Quantity Discount Exercise. Now, ask the members what the “cost” really was in the markup problems in the prior section. The “cost” is the wholesale price. Ask the members what the selling price was in the markup problems in the prior section. The price after markup is the retail price.

#### **INSTRUCTOR NOTES:**

You may need to add to the exercises below and on the handout with some easy ones you create in class yourself to be sure every member answers at least one question correctly during this lecture.

Quantity discount: As an incentive to purchase more items for inventory or for a consumer to buy merchandise in large quantities.

- Discount = regular price x percent discount.
- Regular price - discount = net price.
- Total product cost = number of items ordered (bought) x net price.

Caution: Be sure to check the volume of items needed to be purchased before the quantity discount takes effect. In fact, sometimes it is less expensive to purchase the amount of items where the discount starts than it is to purchase a few items less than the amount of items where the discount starts.

#### Quantity discounts

##### Exercises:

The regular price for pants is \$10. However, there is a 20% discount if you purchase 10 or more. What is the net price if you buy at least 10 pairs of pants?

$$\$10 - (\$10 \times 20\%) = \text{net price.} \quad \$10 - \$2 = \$8.$$

If you buy 20 pairs of pants what is your total product cost?

$$\text{Total product cost} = 20 \times \$8 = \$160.$$

The regular price for vitamins is \$30 per bottle. However, there is a 30% discount if you purchase 100 bottles or more. What is the net price if you buy at least 100 bottles?

$$\$30 - (\$30 \times 30\%) = \text{net price} \quad \$30 - \$9 = \$21.$$

If you buy 100 bottles of vitamins what is your total product cost?

$$\text{Total product cost} = 100 \times \$21 = \$2100.$$

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## BUSINESS MATH TEACHING PLAN

### LESSON 3

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Business Word Problems - Manufacturing	Manufacturing Exercise - page BM45	Page BM46	<p>Explain how percentages are used in manufacturing both in determining how to manufacture a product (i.e. how much of each raw material to use) and in terms of how to staff the assembly line (i.e. staff needed on each section of the assembly line based on time spent in each section). Also explain the concept of <i>scrap</i>. Review the formulas and exercises on the right for raw material use. Then review the formulas and exercises for staffing. After completing all the exercises on the right, distribute and have the class perform the Manufacturing Exercise.</p> <p><b>*Note: The object of this exercise is to calculate simple percentages; it is not intended to solve algebraic expression.</b></p>

#### **INSTRUCTOR NOTES:**

You may need to add to the exercises below and on the handout with some easy ones you create in class yourself to be sure every member answers at least one question correctly during this lecture

#### Raw material use:

*Scrap* -- not all finished product can be used: a portion of it is wasted, and the waste is called *scrap*.

Total production = production desired + scrap

Scrap = production desired x percent scrap

Unit of specific raw material = total units required to build product x percent of that specific raw material required

#### Exercises:

Your composite plastic consists of 20% of product A, 30% of product B and 50% of product C. If you want to make 500 pounds of composite plastics, how many units are needed of each of the three products (A, B, C)?

Product A =  $500 \times 20\% = 100$  pounds.

Product B =  $500 \times 30\% = 150$  pounds.

Product C =  $500 \times 50\% = 250$  pounds.

Your composite plastic consists of 10% of product A, 60% of product B and 30% of product C.

Assuming that you have 10% scrap, how many units of each of the three products (A, B, C) are required to make 100 pounds of composite plastics?

Product A =  $(100 + (100 \times 10\%)) \times 10\% = 110 \times 10\% = 11$  pounds

Product B =  $(100 + (100 \times 10\%)) \times 60\% = 110 \times 60\% = 66$  pounds

Product C =  $(100 + (100 \times 10\%)) \times 30\% = 110 \times 30\% = 33$  pounds

How much of the final product was scrap?  $100 \times 10\% = 10$  pounds.

\*See Note in Lecture Flow.

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## BUSINESS MATH TEACHING PLAN

### LESSON 3

Staff:

Number of employees needed for function = total number of employees x percent needed for that function.

Examples:

A manufacturing company needs 25% of their assembly line employees on machine 1, 35 % on machine 2 and 40% on machine 3. If the company has 20 employees, how many are needed on each machine?

Machine 1 =  $20 \times 25\% = 5$  employees

Machine 2 =  $20 \times 35\% = 7$  employees

Machine 3 =  $20 \times 40\% = 8$  employees

A manufacturing company needs 43% of their assembly line employees on machine 1, 22 % on machine 2 and 35% on machine 3. If the company has 300 employees, how many are needed on each machine?

Machine 1 =  $300 \times 43\% = 129$  employees

Machine 2 =  $300 \times 22\% = 66$  employees

Machine 3 =  $300 \times 35\% = 105$  employees

## BUSINESS MATH TEACHING PLAN LESSON 3

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Business Word Problems - Money	Counting Money Exercise - page BM47	Page BM48	<p>Review monetary denominations very briefly. Then perform the exercises on the right. Next distribute the Counting Money Exercise.</p> <p>Discuss sales tax. Let the class know that retailers that do not charge sales tax can get into serious legal trouble. The state sends out auditors to check inventory records (inventory purchased) against current inventory (determining real sales as opposed to on the books sales) and then checks sales tax records to determine if a business is paying all of their sales taxes.</p> <p>What is your state's sales tax?</p>

**INSTRUCTOR NOTES:**

You may need to add to the exercises below and on the handout with some easy ones you create in class yourself to be sure every member answers at least one question correctly during this lecture.

**Exercises (assume all taxes are included in price):**

A customer gives you a \$10 bill for an item purchased at \$1.99. How much change is he owed?  
\$8.01

A customer gives you a \$5 bill for an item purchased at \$4.55. How much change is he owed?  
\$0.45

A customer purchases three items. Item 1 is priced \$5.75, item 2 is priced \$4.22 and item 3 is priced \$6.07. If the customer gives you a \$20 bill, how much change is owed him?  
\$3.96

A customer purchases three items and returns one item. Item 1 is priced \$15.08, item 2 is priced \$4.67, item 3 is priced \$78.24 and the item returned is priced at \$90. How much money does the customer owe? If the customer pays with a \$100 bill what change if any do they receive?  
Customer owes \$7.99  
Change = \$92.01

**BM38**

**Revision 8.1**

**Work Certified™ 1.2016**

## BUSINESS MATH TEACHING PLAN OVERVIEW LESSON 4

This lesson plan is for three hours. Take two 10-minute breaks at appropriate times.

TOPIC	TIME	COPIES REQUIRED as HANDOUTS
Solving Financial Tasks with Excel® Spreadsheets	45-60 minutes	Solving Financial Tasks with Excel® Spreadsheets- page BM52  Excel Checkbook Exercise- page BM53
Line, Bar, and Pie Graphs	25-30 minutes	Line Graph Handout - page BM54 Bar Graph Handout - page BM55 Pie Chart Handout - page BM56
Graph Exercise	25-30 minutes	Graph Exercise - page BM57
Business Math Quiz	45-60 minutes	Business Math Online Quiz

## BUSINESS MATH TEACHING PLAN

### LESSON 4

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Solving Financial Tasks with Excel® Spreadsheets	Solving Financial Tasks with Excel® Spreadsheets Handout - page BM52 Excel Checkbook Exercise - page BM53	N/A	Using skills from the Business Technology module, members have a chance to use the Excel spreadsheet program and implement an activity to create and learn how to balance a checkbook.

**INSTRUCTOR NOTES:**

Members may use their handouts and notes to perform the exercise using Excel® to balance a checkbook and learn to be more comfortable in using this program.

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Line, Bar, and Pie Graphs	Line Graph Handout - page BM54 Bar Graph handout - page BM55 Pie Chart Handout - page BM56	N/A	Explain line and bar graphs and pie charts. Tell when they are each best used (see notes on right). Then do a sample graph on the board using the data on the right. Then, using the three graph handouts, continue to review graphs with the members.

**INSTRUCTOR NOTES:**

Make sure all members know how to do line and bar graphs. The graph exercise follows this lecture.

Line graphs - to compare how something is performing over time (i.e. sales over the last 12 months).

Bar graphs - to compare different items to each other (i.e. profits of 5 different companies).

Pie charts - to show how items compare to each other proportionately (i.e. revenue generated from 5 different product lines) or to show how individual items proportionately make up a whole (i.e. age group classifications that bought a particular product).

**Examples:**

Use the data below to show a sample line graph on the board.

Stock prices for a week: \$10, \$12, \$15, \$18, \$22 (in 1000's)

Use the data below to show a sample bar graph on the board.

Sales revenue generated for every day in one week: \$10, \$12, \$15, \$18, \$22 (in 1000's)

Use the data below to show a sample pie chart on the board.

Sales revenue by product line: \$20, \$30, \$40, \$10 (in 1000's)

Product line A = 20%, product line B = 30%, product line C = 40%, product line D = 10%.

**BM50**

**Revision 8.1**

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## BUSINESS MATH TEACHING PLAN LESSON 4

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
<u>Competency-</u> Graph Exercise	Graph Exercise - page BM57	Pages BM58- 59	Distribute the graph exercise.

**INSTRUCTOR NOTES:**

line and bar graphs must be completed with no errors. Instructors have the option of having students complete this exercise on paper, the computer, or use both media to accomplish this competency

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
<u>Competency-</u> Business Math Module Online Quiz	LMS Database/Program Website- www.workcertified.org		Business Math Quiz is <u>online</u> .  See hardcopy of quiz and answer key in Chapter 3: LMS Database/Module Quizzes

**INSTRUCTOR NOTES:**

1. Members may use the Business Math Study Guide, page BM60, with the quiz.
2. Distribute the Member Program Evaluation Form (see Chapter 2) just prior to handing out this quiz and be sure to fill out your Instructor Program Critique Form (see Chapter 2). Members must score 80% or higher on this quiz to be eligible for certification.

**THE BUSINESS MATH STUDY GUIDE HANDOUT CAN BE USED FOR THE ONLINE QUIZ**