BUSINESS MATH

"Mathematics is like love; a simple idea, but it can get complicated."
~Anonymous

BM1

BUSINESS MATH
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BUSINESS MATH

SUMMARY

BM3

BUSINESS MATH INSTRUCTOR'S SUMMARY

Title: Business Math

Hours: 12 hours

Description: 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.

Objectives: 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.

Materials: A marker board or chalk board, a course outline, a calculator, in-class exercises, handouts and graph paper (optional).

Implementation: 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!

Topics: 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

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 <u>separate</u> topic as it relates to answering a minimum of one question correctly in class.

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.**

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

BUSINESS MATH TEACHING PLAN
LESSON 1

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Decimals	Add/Subtract Decimals Exercise - page BM17	Page BM18	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.
	Multiply/Divide Decimals Exercise - page BM19	Page BM20	

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 x 5.0 = 26.5
10.5 x 10.9 = 114.45
25.6 x 11.1 = 284.16
10.33 x 5.00 = 51.65
30.15 x 50.10 = 1510.515
20.22 x 40.44 = 817.6968

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

BASIC MATH EXERCISES

Addition:

1. 30 + 200 + 45 + 40 =

2. 12 + 112 + 1112 =

3. 8 + 40 + 210 =

Subtraction:

1. 125 - 10 - 15 =

2. 235 - 55 - 6 =

3. 150 − 65 - 8 =

Addition and Subtraction Combined:

1. 150 + 50 - 25 =

2. 60 - 43 + 100 =

3. 300 - 50 + 75 - 25 =

4 500 - 6 + 17 =

5. 99 + 1 - 50 - 50 =

6. 6000 + 400 - 7 =

Multiplication:

1. 66 x 4 =

2. 123 x 15 =

3. 8 x 98 =

Division:

1. 35 ÷ 5 =

2. 240 ÷ 3 =

3. 6464 ÷ 8 =

Various Combinations:

1. (12 x 2) +8 =

2. (25 ÷ 5) -1 =

3. (5 + 6) x 6 =

4. 10 x (12 - 5) =

5. 5 x 4 ÷ 2 =

6. (4 x 8 ÷ 4) + 10 =

BM11

BASIC MATH EXERCISES
ANSWER KEY

Addition:

1. 30 + 200 + 45 + 40 = **315**

2. 12 + 112 + 1112 = **1236**

3. 8 + 40 + 210 = **258**

Subtraction:

1. 125 - 10 - 15 = **100**

2. 235 - 55 - 6 = **174**

3. 150 − 65 - 8 = **77**

Addition and Subtraction Combined:

1. 150 + 50 - 25 = **175**

2. 60 - 43 + 100 = **117**

3. 300 - 50 + 75 - 25 = **300**

4. 500 - 6 + 17 = **511**

5. 99 + 1 - 50 - 50 = **0**

6. 6000 + 400 - 7 = **6393**

Multiplication:

1. 66 x 4 = **264**

2. 123 x 15 = **1845**

3. 8 x 98 = **784**

Division:

1. 35 ÷ 5 = **7**

2. 240 ÷ 3 = **80**

3. 6464 ÷ 8 = **808**

Various Combinations:

1. (12 x 2) +8 = **32**

2. (25 ÷ 5) -1 = **4**

3. (5 + 6) x 6 = **66**

4. 10 x (12 - 5) = **70**

5. 5 x 4 ÷ 2 = **10**

6. (4 x 8 ÷ 4) + 10 = **18**

TOPIC A: ROUNDING/ESTIMATING NUMBERS

<u>Rounding Numbers</u>

Using the practice of <u>rounding numbers</u> is often helpful because it simplifies numbers and makes them easier to work with. Rounding numbers often makes mental math much easier and is often key to estimating which will be discussed next.

At some point in our mathematics education in school or in a previous job, we have completed the mental math activities such as rounding numerals to the nearest ten, hundred, thousand, and so on. We use this skill in real life, such as when shopping to figure out if we have enough money to buy something or when trying to divide a large amount of items among a few people. Additionally, rounding can assist you in calculating amounts of money, lengths of time, distances, and many other physical quantities. Rounded numbers are only approximate. You cannot get an exact answer with rounded numbers. Rounding can be accomplished with both whole and decimal number.

General Rules for Rounding

- If the number you are rounding to is followed by 5, 6, 7, 8, or 9 round the number up. For example 38 rounded to the nearest ten is 40
- If the number you are rounding to is followed by 0, 1, 2, 3, or 4 round the number down. For example 33 rounded to the nearest ten is 30
- When rounding, you first need to ask what number you are rounding to. Number can be rounded to the nearest ten, hundred, thousand, and so on. For example, take the number 4827
    - 4827 rounded to the nearest 10 is 4830
    - 4827 rounded to the nearest 100 is 4800
    - 4827 rounded to the nearest 1000 is 5000
- Rounding decimals works the same way as with whole numbers with the only difference being that instead of rounding tens hundreds, thousand, and such, you round tenths, hundredths, thousands, etc. For example:
    - 7.829 rounded to the nearest tenth is 7.8
    - 1.0621 rounded to the nearest hundredth is 1.06
    - 3.8797 rounded to the nearest thousandth is 3.880
- One way to avoid confusion in rounding decimals is to only look at the number in the place you are rounding to and the number that follows it. For example, to round 5.3824791401 to the nearest hundredth, just look at the number in the hundredths place—8—and the number that follows it—2. Then you can easily round it to 5.38

> 1 through 4, stay on the floor…5 through 9 climb the vine!

BM13

Example:

You are responsible for ordering supplies for your team this month. You have a budget of $500.00. Each person needs 2 legal pads, 2 pens, 2 pencils, and 10 folders. You are ordering for 25 people.

Legal pads, box of 50 =	$135.59ea	Folders, box of 300	=	$186.19ea
Pens, box of 100 =	$75.06ea	Pencils, box of 100	=	$8.74ea

Using your rounding rules above to simplify the amounts first to the <u>nearest tenth</u> and then to the <u>nearest whole number</u>

Let's take a look.....

<u>Rounding these figures first to the nearest **tenth**</u>:

Legal pads, box of 50 =	$135.60ea	Folders, box of 300	=	$186.20ea
Pens, box of 100 =	$75.00ea	Pencils, box of 100	=	$ 8.70ea

<u>Rounding these figures first to the nearest dollar (whole number)</u>:

Legal pads, box of 50 =	$136.00ea	Folders, box of 300	=	$187.00ea
Pens, box of 100 =	$75.00ea	Pencils, box of 100	=	$ 9.00ea

Estimating Totals

Practicing estimation is more involved than rounding numbers because is also involves the often mental calculation of a total or sum. For example, using the above same problem, let's see how estimating will work:

You are responsible for ordering supplies for your team this month. You have a budget of $500.00. Each person needs 2 legal pads, 2 pens, 2 pencils, and 10 folders. You are ordering for 25 people. What will be the estimated cost of the supplies?

Legal pads, box of 50 =	$135.59ea	Folders, box of 300	=	$186.19ea
Pens, box of 100 =	$ 75.06ea	Pencils, box of 100	=	$ 8.74ea

Estimating the costs...

Legal pads, box of 50 =	$136.00ea	Folders, box of 300	=	$186.00ea
Pens, box of 100 =	$ 75.00ea	Pencils, box of 100	=	$ 9.00ea

136.00 + 186.00 + 75.00 + 9.00 = 406.00

BM14

ROUNDING/ESTIMATING NUMBERS EXERCISE

Use your rounding and estimation skills for the following series of numbers:
(Note: Round the series to the nearest whole number.)

1. 100.65 + 100.33+ 100.21 + 100.01 + 100.99

    Rounding   =
    Estimate   =

2. 101.67 + 100.77 + 100.85 + 100.00 + 100.26

    Rounding   =
    Estimate   =

3. 100.66 + 100.20 + 100. 54 + 100.32 + 100.71

    Rounding   =
    Estimate   =

4. 10.432 + 17.487 + 1.509 + 10.600 + 10.771

    Rounding   =
    Estimate   =

5. Sally is in charge of the office supply ordering for MP Printing. Her boss, Jack, asks Sally to give
    him an estimate of costs for the last month immediately for a business meeting. No time for an
    exact answer, just off her accounts payable sheet! Sally glances over the below entries:
    Week #1= 250.12
    Week #2= 350.27
    Week #3= 900.08
    Week #4= 100.02
    <u>Her answer is:</u>
    a. Around $ 1600.00
    b. Almost $ 2000.00
    c. "I have no idea!" she replies

BM15

ROUNDING EXERCISE
ANSWER KEY

Estimate the following series of numbers using both the rounding methods:
(Note: Round the series to the nearest whole number.)

1. 100.65 + 100.33+ 100.21 + 100.01 + 100.99

   Rounding   = 101 + 100 +100 + 100 +101 = 502
   Estimation   = 100 +100 +100 + 100 + 101 = 501

2. 101.67 + 100.77 + 100.85 + 100.00 + 100.26

   Rounding   = 102 + 101 + 101 + 100 + 100 = 504
   Estimation   = 102 + 101 + 101 + 100 + 100 = 504

3. 100.66 + 100.20 + 100. 54 + 100.32 + 100.71

   Rounding   = 101 + 100 + 101 + 100 + 101 = 503
   Estimation   = 100 +100 +100 + 100 + 100 = 500

4. 10.432 + 17.487 + 1.509 + 10.600 + 10.771

   Rounding   = 10 + 17 + 2 + 11 + 11 = 51
   Estimation   = 10 + 17 + 1 + 10 + 10 = 48

5. Sally is in charge of the office supply ordering for MP Printing. Her boss, Jack, asks Sally to give him a rounded estimate of costs for the last month immediately for a business meeting. No time for an exact answer, just off her accounts payable sheet! Sally glances over the below entries and in rounding them:
   Week #1= 250.12 **(250.00)**
   Week #2= 350.27 **(350.00)**
   Week #3= 900.08 **(900.00)**
   Week #4= 100.02 **(100.00)**

   <u>Her answer is:</u>
   a. Around $ 1600.00

TOPIC B: BUSINESS MATH GUIDE

Rules to follow:

FRACTIONS:

1. **Addition/Subtraction** - find the common **denominator** (bottom number) and perform the operation (add or subtract) to the **numerator** (top number) ONLY.

2. **Multiplication** – multiply the top numbers (numerators) together and then the bottom numbers (denominators) together. **E.g.** $\frac{4}{5} \times \frac{2}{9} = \frac{4 \times 2}{5 \times 9} = \frac{8}{45}$ and $\frac{1}{3} \times \frac{9}{10} = \frac{1 \times 9}{3 \times 10} = \frac{9}{30} = \frac{9 \div 3}{30 \div 3} = \frac{3}{10}$
   Then just reduce it

3. **Division** – To divide a fraction, you must convert it to a multiplication problem by inverting the fraction you are dividing by (i.e. the fraction on the right) and multiply as directed above.   e.g. $\frac{1}{3} \div \frac{4}{5} = \frac{1}{3} \times \frac{5}{4} = \frac{1 \times 5}{3 \times 4} = \frac{5}{12}$
   also $\frac{6}{11} \div \frac{1}{2}$ becomes $\frac{6}{11} \div \frac{1}{2} = \frac{6}{11} \times \frac{2}{1} = \frac{6 \times 2}{11 \times 1} = \frac{12}{11} = 1\frac{1}{11}$

4. **To reduce** a fraction to its lowest value, first try dividing the denominator or numerator into each other (above $^6/_3$ = 2 or $^8/_{16}$ = $^1/_2$. Another way is to find a common number that can be divided evenly into **_both_** numerator and denominator. ($^{36}/_{48}$ both can be evenly divided by 12, which equals $^3/_4$).

5. **Simplify -** To convert complex fractions to simple fractions *multiply* the denominator by the whole number and *add* the numerator   eg. **7 $^1/_3$ = $\frac{(7x3) +1}{3}$ = $^{22}/_3$**

DECIMALS:

1. **Addition** Rule: decimal lines up.
2. **Subtraction** Rule: decimal lines up
3. **Multiplication**:   To determine the proper number of decimals for multiplication: add the total number of decimal places in the problem – i.e. the sum of the number of decimals places of the multiplicand and the multiplier.

   Rule: Remove the decimal; follow multiplication as for whole numbers and replace the decimal in the proper spot per the rule above. When replacing the decimal, count backward from the <u>last</u> digit, right to left.

4. **Division**:
   Dividend: The number you're dividing.
   Divisor: The number you're dividing by.
   Quotient: The answer you get when you divide the **dividend** by the **divisor**.

   Move the decimals of the **divisor** so that you are dividing by a whole number, move the decimal of the **dividend** by that same number of places. Divide as per long division keeping the decimal of the **quotient** in place with the decimal of the **dividend.** (Remember that when the *last* decimal place is a zero, it has ***no value*** and therefore should be ignored (e.g. 5.0 becomes 5, 2.340 becomes 23.4)

CONVERSIONS:

<u>**Fraction to decimals**</u>: 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

<u>**Decimal to fraction**</u>: the number after the decimal over the whole number equivalent of the last decimal place that the decimal goes out to (i.e. 0.115 goes out to the thousandths so the fraction would be 115/1000).
When changing a whole number with a decimal to a fraction the whole number remains unchanged and the decimal portion is placed as described above.   Examples: 9.35 = 9 35/100

<u>**Decimal to percent**</u>: move the decimal two places to the right

<u>**Percent to decimal**</u>: move the decimal two places to the left (e.g. 50% = 50/100 = 0.5)

FINANCIAL STATEMENTS:

5. Assets minus Liabilities equal Owner's Equity (Balance Sheet)
6. Revenue minus Expenses equal Net Income (Income Statement)

BM60

ADD/SUBTRACT DECIMALS EXERCISE

Addition:

1. 33.41 + 10.0 =   2. 108.10 + 2.06 =

3. 123.99 + 43.99 =   4. 23.44 + 44.23 =

5. 1447.22 + .12 =   6. 782.55 + 989.022 =

Subtraction:

1. 87.22 – 58.47 =   2. 190.77 - 80.7 =

3. 114.12 - 18.13 =   4. 577.75 - 97.65 =

5. 1,014.1 - 555.28 =   6. 900.777 - 550.505 =

BM17

ADD/SUBTRACT DECIMALS EXERCISE
ANSWER KEY

Addition:

1. 33.41 + 10.0 = **43.41**

2. 108.10 + 2.06 = 110.16

3. 123.99 + 43.99 = **167.98**

4. 23.44 + 44.23 = **67.67**

5. 1447.22 + .12 = **1447.34**

6. 782.55 + 989.022 = **1771.572**

Subtraction:

1. 87.22 – 58.47 = **28.75**

2. 190.77 - 80.7 = **110.07**

3. 114.12 - 18.13 = **95.99**

4. 577.75 - 97.65 = **480.10**

5. 1,014.1 - 555.28 = **458.82**

6. 900.777 - 550.505 = **350.272**

BM18

MULTIPLY/DIVIDE DECIMALS EXERCISE

Multiplication:

1. 11.5 x 5.5 =

2. 6.23 x 4.01 =

3. 3.21 x 1.50 =

4. 100.25 x 8.22 =

5. 5.7 x 8.10 =

6. 8.9 x .011 =

Division:

1. 125 ÷ 12.5 =

2. 100.5 ÷ 0.25 =

3. 111 ÷ 14.5 =

4. 96.8 ÷ 16 =

5. 10.998 ÷ 2.5 =

6. 54.6 ÷ 36.4 =

MULTIPLY/DIVIDE DECIMALS EXERCISE
ANSWER KEY

Multiplication:

1. 11.5 x 5.5 = **63.25**

2. 6.23 x 4.01 = **24.9823**

3. 3.21 x 1.50 = **4.815**

4. 100.25 x 8.22 = **824.055**

5. 5.7 x 8.10 = **46.17**

6. 8.9 x .011 = **.0979**

Division:

1. 125 ÷ 12.5 = **10**

2. 100.5 ÷ 0.25 = **402**

3. 111 ÷ 14.5 = **7.655**

4. 96.8 ÷ 16 = **6.05**

5. 10.998 ÷ 2.5 = **4.3992**

6. 54.6 ÷ 36.4 = **1.5**

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

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.

<u>Simple fractions</u>
Addition:
1/3 + 2/3 = 1
1/3 +1/6 =3/6 = 1/2
2/3 + 2/3 = 4/3 = 1 1/3
10/12 + 4/6 = 18/12 = 1 6/12 = 1 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 x 1/3 = 1/9
2/7 x 3/5 = 6/35
4/5 x 2/10 = 8/50 = 4/25
3/8 x 6/7 = 18/56 = 9/28

Division:
1/3 divided by 1/2 = 1/3 x 2/1 = 2/3
2/5 divided by 2/3 = 2/5 x 3/2 = 6/10 = 3/5
10/12 divided by 11/12 = 10/12 x 12/11 = 120/132 = 60/66 = 30/33
1/8 divided by 1/4 = 1/8 x 4/1 = 4/8 = 1/2
3/10 divided by 2/3 = 3/10 x 3/2 = 9/20
4/25 divided by 1/4 = 4/25 x 4/1 = 16/25

BM22

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 3/7 + 6/7 = 10/7 +6/7 = 16/7 = 2 2/7
1 1/3 + 1/3 = 4/3 + 1/3 = 5/3 = 1 2/3
Or you can add the whole numbers then add the fractions;
10 1/3 + 5 5/6 = 15 + 1/3 + 5/6 = 15 + 2/6 + 5/6 = 15 + 7/6 = 16 1/6
15 3/32 + 22 9/10 = 37 + 3/32 + 9/10 = 37 + 30/320 + 288/320 = 37 + 318/320 = 37 159/160

Subtraction:
5/3 - 1/3 = 4/3 = 1 1/3
4 3/5 - 2/5 = 23/5 - 2/5 = 21/5 = 4 1/5
Or you can subtract the whole numbers then subtract the fractions;
12 2/3 - 6 1/6 = 6 + 2/3 - 1/6 = 6 + 4/6 - 1/6 = 6 + 3/6 = 6 1/2
10 1/5 - 5 1/3 = 5 + 1/5 - 1/3 = 5 + 3/15 - 5/15 = 5 + (-)2/15 = 4 15/15 - 2/15 = 4 13/15

Multiplication:
2/3 x 4 = 8/3 = 2 2/3
2 2/5 x 3/5 = 12/5 x 3/5 = 36/25 = 1 11/25
Note: you cannot multiply the whole numbers then the fractions and add them together;
Try it: 6 2/3 x 3 2/10 = 18 + 2/3 x 2/10 = 18 + 4/30 = 18 2/15 **is not the correct answer**.
2 1/3 x 2 1/6 = 7/3 x 13/6 = 91/18 = 5 1/6

Division:
1/2 divided by 1/3 = 1/2 x 3/1 = 3/2 = 1 1/2
2/3 divided by 2/5 = 2/3 x 5/2 = 10/6 = 1 4/6 = 1 2/3
Note: You cannot divide the whole numbers then the fractions and add them together;
Try it: 3 1/3 divided by 1 1/3 = 3 + 1/3 x 1/3 = 3 + 1/9 = 3 1/9 **is not the answer**.
10 2/8 divided by 2 1/4 = 82/8 divided by 9/4 = 82/8 x 4/9 = 328/72 = 4 40/72 = 4 5/9

BM23

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	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. 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. Websites: http://www.metric-conversion-tables.com/autometricconversion.htmhttp://www.mcgees.com/kitchen/metric.htm

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 x 100 = 50%)

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

BM24

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 25/100 = 1 1/4
    2.6 = 2 6/10 = 2 3/5
    100.125 = 100 125/1000 = 100 25/200 = 100 5/40 = 100 1/8
    45.06 = 45 6/100 = 45 3/50
    11.009 = 11 9/1000
    67.035 = 67 35/1000 = 67 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 divided by 2 = 0.5
    3/5 = 3 divided by 5 = 0.6
    12/50 = 12 divided by 50 = 0.24
    7/15 = 7 divided by 15 = 0.47
    (rounded to two decimals)
    11/440 = 11 divided by 440 = .025
    20/12 = 20 divided by 12 = 1.67 (rounded to two decimals)

BM25

ADD/SUBTRACT/MULTIPLY/DIVIDE SIMPLE FRACTIONS EXERCISES

Addition:

1. 3/5 + 4/5 =

2. 14/30 + 1/6 =

3. 3/21 + 7/7 =

4. 3/5 + 1/8=

5. 2/3 + 7/9 =

6. 3/8 + 1/2 =

Subtraction:

1. 9/10 - 5/10

2. 6/9 - 1/12 =

3. 6/18 - 1/6 =

4. 7/6 - 4/5 =

5. 15/35 - 3/15 =

6. 8/5 - 5/6 =

Multiplication:

1. 1/5 x 4/5 =

2. 3/4 x 1/2 =

3. 4/8 x 10/10 =

4. 3/9 x 2/10 =

5. 5/9 x 1/3 =

6. 5/11 x 1/6 =

Division:

1. 1/4 ÷ 1/3 =

2. 3/7 ÷ 3/4 =

3. 1/8 ÷ 4/5 =

4. 2/11 ÷ 9/12 =

5. 4/10 ÷ 9/10 =

6. 1/100 ÷ 35/40 =

BM26

ADD/SUBTRACT/MULTIPLY/DIVIDE SIMPLE FRACTIONS EXERCISES
ANSWER KEY

Addition:

1. 3/5 + 4/5 =

   3/5 + 4/5 = 7/5

2. 14/30 + 1/6 =

   14/30 + 1/6 = 14/30 + 5/6 = 19/30

3. 3/21 + 7/7 =

   3/21 + 21/21 = 24/21 or 1 3/21

4. 3/5 + 1/8=

   3/5 + 1/8 = 24/40 + 5/40 = 29/40

5. 2/3 + 7/9 =

   2/3 + 7/9 = 6/9 +7/9 = 13/9 or 1 4/9

6. 3/8 + 1/2 =

   3/8 + 1/2 = 3/8 + 4/8 = 7/8

Subtraction:

1. 9/10 - 5/10

   9/10 − 5/10 = 4/10 or 2/5

2. 6/9 - 1/12 =

   6/9 − 1/12 = 72/108 − 9/108 = 63/108 or 7/12

3. 6/18 - 1/6 =

   6/18 -1/6 = 6/18 − 3/18 = 3/18 or 1/6

4. 7/6 - 4/5 =

   7/6 − 4/5 = 35/30 − 24/30 = 11/30

5. 15/35 - 3/15 =

   15/35-3/15= 225/525 -105/525 =

   120/525 or 24/105

6. 8/5 - 5/6 =

   8/5 − 5/6 = 48/30-25/30 = 23/30

Multiplication:

1. 1/5 x 4/5 =

   1/5 x4/5 = 4/25

2. 3/4 x 1/2 =

   3/4 x 1/2 = 3/8

3. 4/8 x 10/10 =

   4/8 x 10/10 = 40/80 or 4/8

4. 3/9 x 2/10 =

   3/9 x 2/10 = 6/90 or 2/30 or 1/15

5. 5/9 x 1/3 =

   5/9 x 1/3 = 5/27

6. 5/11 x 1/6 =

   5/11 x 1/6 = 5/66

Division:

1. 1/4 ÷ 1/3 =

   1/4 x 3/1 = 3/4

2. 3/7 ÷ 3/4 =

   3/7 x 4/3 = 12/21 or 4/7

3. 1/8 ÷ 4/5 =

   1/8 x 5/4 = 5/32

4. 2/11 ÷ 9/12 =

   2/11 x 12/9 = 24/99

5. 4/10 ÷ 9/10 =

   4/10 x 10/9 = 40/90 or 4/9

6. 1/100 ÷ 35/40 =

   1/100 x 40/35 = 40/3500 or 4/350 or 2/175

BM27

ADD/SUBTRACT/MULTIPLY/DIVIDE COMPLEX FRACTIONS EXERCISES

Addition:

1. 3 2/6 + 7 1/6 =

2. 20 1/3 + 5 1/6 =

2. 11 2/6 + 14 2/5 =

4. 161 2/9 + 100 1/7 =

Subtraction:

1. 10 5/6 - 5 1/6 =

2. 24 9/14 - 12 3/7 =

3. 30 2/3 - 14 3/7 =

4. 9 2/5 - 3 1/10 =

Multiplication:

1. 3/5 x 10 =

2. 4 1/6 x 2/3 =

3. 2 2/7 x 2 2/9 =

4. 10 6/7 x 3 4/9 =

Division:

1. 1/3 ÷ 1/4 =

2. 4 1/2 ÷ 1/3 =

3. 10 ÷ 3/10 =

4. 6 1/3 ÷ 2 1/5 =

BM28

ADD/SUBTRACT/MULTIPLY/DIVIDE COMPLEX FRACTIONS EXERCISES
ANSWER KEY

Addition:

1. $3\ 2/6 + 7\ 1/6 =$ **10 3/6 =** **10 1/2**

2. $20\ 1/3 + 5\ 1/6 =$ **25 + 2/6 + 1/6 = 25 3/6 =** **25 1/2**

3. $11\ 2/6 + 14\ 2/5 =$ **11 10/30 + 14 12/30 = 25 22/30 =** **25 11/15**

4. $161\ 2/9 + 100\ 1/7 =$ **261 14/63 + 9/63 =** **261 23/63**

Subtraction:

1. $10\ 5/6 - 5\ 1/6 =$ **5 4/6 =** **5 2/3**

2. $24\ 9/14 - 12\ 3/7 =$ **12 9/14 - 6/14 =** **12 3/14**

3. **30 2/3 - 14 3/7 = 16 14/21 - 9/21 =** **16 5/21**

4. $9\ 2/5 - 3\ 1/10 =$ **6 4/10 - 1/10 =** **6 3/10**

Multiplication:

1. $3/5 \times 10 =$ **3/5 x 10/1 = 30/5 =** **6**

2. $4\ 1/6 \times 2/3 = 25/6 \times 2/3 =$ **50/18 = 2 14/18 =** **2 7/9**

3. $2/7 \times 2\ 2/9 =$ **16/7 x 20/9 = 320/63 =** **5 5/63**

4. $10\ 6/7 \times 3\ 4/9 =$ **76/7 x 31/9 = 2,356/63 =** **37 25/63**

Division:

1. $1/3 \div 1/4 =$ **1/3 x 4/1 = 4/3 =** **1 1 /3**

2. $4\ 1/2 \div 1/3 =$ **9/2 x 3/1 = 27 /2 =** **13 1/2**

3. $10 \div 3/10 =$ **10/1 x 10/3 = 100/3 =** **33 1/3**

4. $6\ 1/3 \div 2\ 1/5 =$ **19/3 x 5/11 = 95/33 =** **2 29/33**

BM29

TOPIC C: SYSTEMS OF MEASUREMENT

NUMBER LINE/PLACE VALUE CHART

| PLACE VALUE FOR WHOLE NUMBERS										PLACE VALUE FOR DECIMALS							
MILLIONS			THOUSANDS			ONES											
Hundreds	*Tens*	*Ones*	*Hundreds*	*Tens*	*Ones*	*Hundreds*	*Tens*	*Ones*		*Tenths*	*Hundredths*	*Thousandths*	*Ten Thousandths*	*Hundred Thousandths*	*Millionths*	*Ten Millionths*	*Hundred Millionths*
9	8	7	6	5	4	3	2	1	•	1	2	3	4	5	6	7	8

METRIC AND ENGLISH RULERS

Metric rulers measure with centimeters and millimeters.

The larger lines with numbers are centimeters, and the smallest lines are millimeters. Since millimeters are 1/10th of a centimeter, if you measure 7 marks after a centimeter, it is 1.7 centimeters long.

English rulers measure with fractions. This ruler is marked 1/8ths of an inch.
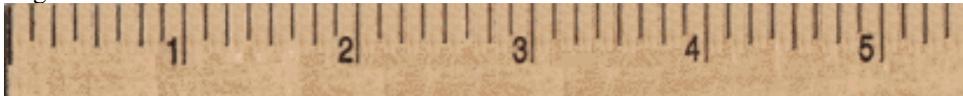
The center mark between numbers is 1/2.
The next smallest marks on a ruler are 1/4ths.
The next smallest marks on a ruler are 1/8ths.
The next smallest mark, if there are any, are 1/16ths.

- When marking down a distance from a ruler, mark the whole inch, followed by a space, then the fraction of an inch. For example, 1 1/2, or 2 3/8.
- When entering fractions into the conversion calculators, you have to separate the whole number and the fraction with a + sign. For example, 1+1/2, or 2+3/8.

SYSTEMS OF MEASUREMENT: tables below show some common systems of measurements used every day.

Units of Length (Distance)
12 inches (in) = 1 foot (ft)
3 feet (ft) = 1 yard (yd)
1760 yards = 1 mile (ml)

Units of Weight (Mass)
16 ounces (oz) = 1 pound (lb)
2,000 pounds (lb) = 1 ton (T)

Units of Volume
8 fluid ounces (fl oz) = 1 cup (c)
2 cups (c) = 1 pint (pt)
2 pints (pt) = 1 quart (qt)
4 quarts (qt) = 1 gallon (gal)

Metric Units of Length
10 millimeters = 1 centimeter (cm)
100 centimeters = 1 meter (m)
1000 meters = 1 kilometer (km)

Metric Units of Weight
1000 milligrams (mg) = 1 gram (g)
1000 grams = 1 kilogram (kg)
1000 kilograms = 1 metric ton (T)

Metric Units of Volume
1000 milliliters (mL) = 1 liter (L)
1000 liters = 1 kiloliter (kL)

Metric to standard Length Conversion
Metric Units   Standard Units
1 millimeter = 0.03937 inch
1 centimeter = 0.3937 inch
1 meter = 39.37 inches (3.2808 feet or 1.09 yards)
1 kilometer = 0.62 miles (3,280.8 feet or 1093.6 yards)

BM30

DECIMAL, FRACTION, MEASUREMENT, PERCENT CONVERSION EXERCISE

Change these decimals to fractions and to percentages:

1. 0.3 =   2. 0.67 =

3. 0.009 =   4. 0.108=

5. 1.1 =   6. 10.75 =

7. 9.108 =   8. 112.09 =

Change these fractions to decimals and to percentages:

1. 4/8 =   2. 1/8 =

3. 20/90 =   4. 5/25 =

5. 7/200 =   6. 12/480 =

Measurement:

7. Write the measurement marked =   8. 1 1/2 cup =   __ oz.

BM31

DECIMAL, FRACTION AND PERCENT CONVERSION EXERCISE
ANSWER KEY

Change these decimals to fractions and to percent:

1. .3 = **3/10, 30%**

2. .67 = **67/100, 67%**

3. .009 = **9/1000, 0.9%**

4. .108= **108/1000 = 27/250, 10.8%**

5. 1.1 = **1 1/10, 110%**

6. 10.75 = **10 75/100 = 10 3/4, 1075%**

7. 9.108 = **9 108/1000 = 9 27/250, 910.8%**

8. 112.09 = **112 9/100, 11209%**

Change these fractions to decimals and to percent:

1. 4/8 = **4 ÷ 8 = 0.5, 50%**

2. 1/8 = 1 ÷ 8, **0.125, 12.5%**

3. 20/90 = **20 ÷ 90 = 2 ÷ 9 =**
   0.222 (rounded to thousandths), 22.2%

4. 5/25 = **5 ÷ 25 = 1 ÷ 5 =**
   0.2, 20%

5. 7/200 = **7 ÷ 200 = 0.035, 3.5%**

6. 12/480 = **12 ÷ 480 = 1 ÷ 40**
   = 0.025, 2.5%

Measurement:

7. Write the measurement marked = **1 3/4**

8. 1 1/2 cup = **12 oz.**

BM32

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

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:
<u>Markup</u>
 Exercises:
 Your cost for shoes is $10. What is your selling price if you want to make 100% on each shoe?
 $10 + ($10x100%) = 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 + ($500x40%) = 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 + ($100x75%) = selling price. $100 + $75 = $175.

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 - ($10x20%) = net price. $10 - $2 = $8.
If you buy 20 pairs of pants what is your total product cost?
Total product cost = 20 x $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 - ($30x30%) = net price $30 - $9 = $21.
If you buy 100 bottles of vitamins what is your total product cost?
Total product cost = 100 x $21 = $2

BM35

BUSINESS MATH TEACHING PLAN
LESSON 3

TOPIC	TOOL	ANSWER KEY	LECTURE FLOW
Business Word Problems - Manufacturing	Manufacturing Exercise - page BM45	Page BM46	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 *scrap*. 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. ***Note: The object of this exercise is to calculate simple percentages; it is not intended to solve algebraic expression**.

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

<u>Raw material use:</u>
 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 x 20% = 100 pounds.
 Product B = 500 x 30% = 150 pounds.
 Product C = 500 x 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 x10%)) x 10% = 110 x 10% = 11 pounds
 Product B = (100 + (100 x10%)) x 60% = 110 x 60% = 66 pounds
 Product C = (100 + (100 x10%)) x 30% = 110 x 30% = 33 pounds
 How much of the final product was scrap? 100 x 10% = 10 pounds.
 *See Note in Lecture Flow.

BM36

BUSINESS MATH TEACHING PLAN
LESSON 3

<u>Staff</u>:

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 x 25% = 5 employees

Machine 2 = 20 x 35% = 7 employees

Machine 3 = 20 x 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 x 43% = 129 employees

Machine 2 = 300 x 22% = 66 employees

Machine 3 = 300 x 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	Review monetary denominations very briefly. Then perform the exercises on the right. Next distribute the Counting Money Exercise. 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. What is your state's sales tax?

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**

TOPIC D: USING A CALCULATOR

Things to keep in mind when using calculator...

A calculator is a tool to do calculations. So are the human mind and paper & pencil. You should know when to use calculator and when mental computing (or even paper & pencil) are more effective or appropriate. Choosing the right 'tool' is part of effective problem-solving. It is very important you learn how to estimate the result before doing the calculation. It is very easy to make mistakes when punching in numbers and you must not learn to 'rely' on the calculator without checking the accuracy of the answer.

Learn the symbols associated with math. Basic calculators are dominated by a few standard symbols including a plus sign (+) for addition problems, a minus sign (-) for subtraction, a multiplication symbol (x or *), a division sign (÷) and an equal sign (=). Understand the processes that go along with the signs. If you don't understand the process of division, it's useless to know the sign because you won't be able to successfully put it to use. By learning basic math principles, you can then use a calculator to put those processes to work.

Acquaint yourself with the layout of a calculator. Most calculators have numbers in the middle, beginning with zero at the bottom of the layout and working upwards, in rows of three, to the number nine. Basic math symbols are generally placed to the right of the numbers. You'll find the percentage button (%) and square root button with the math symbols.

Try a graphing or scientific calculator when you learn more math processes. These calculators perform more difficult mathematical processes and can handle longer strings of numbers. When you learn various formulas and do longer problems, graphing and scientific calculators can do much of the work for you.
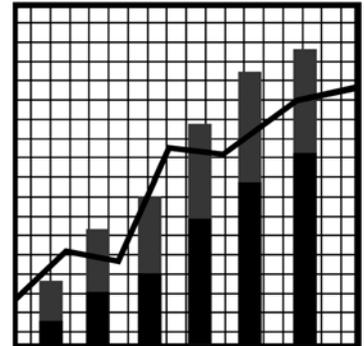
MARKUP/MARKDOWN EXERCISE

Markdown:

1. Your original price for a music CD is $14. What is the sale price if you mark it down 10%?

2. Your original price for a laptop computer is $1,000. What is the sale price if you mark it down 30%?

3. Your original price for chocolate cake is $5.50. What is the sale price if you mark it down 20%?

4. Your original price for NFL footballs is $25. What is the sale price if you mark it down 50%?

5. Your original price of a box of file folders for your office is $15.00/box. If you purchase 100 boxes or more, you receive a markdown of 20% per box. If you order exactly 100 boxes, what is your price?

6. Your original price for the book "Moby Dick" is $15. What is the sale price if you mark it down 25%?

7. Your original price for Résumé consulting services is $75 per hour. What is your sale price if you mark it down 5%?

Markup:

1. Your cost for a pair of dress shoes is $100. What is your selling price if you want to make 75% on each pair?

2. Your cost for wallets is $60. What is your selling price if you want to make 80% on each wallet?

3. Your cost for replacement ink cartridges is $40. What is your selling price if you want to make 50% on each cartridge?

4. Your cost for a used jet-ski is $2000. What is your selling price if you want to make 200% on each jet-ski?

5. Your cost for curtains is $10. What is your selling price if you want to make 100% on each curtain? If the 100% markup becomes your original price and you want to mark it down 30%, what is the new sale price?

6. Your cost for candy is $0.50 a bar. What is your selling price if you want to make 150% on each candy bar?

7. Your cost for the book "Treasure Island" is $10. What is your selling price if you want to make 50% on the book?

MARKUP/MARKDOWN EXERCISE
ANSWER KEY

Markdown:

1. Your original price for a music CD is $14. What is the sale price if you mark it down 10%?
   $14 - ($14 x 10%) = $14 - $1.40 = $12.60

2. Your original price for a laptop computer is $1,000. What is the sale price if you mark it down 30%?
   $1,000 - ($1,000 x 30%) = $1,000 - $300 = $700

3. Your original price for chocolate cake is $5.50. What is the sale price if you mark it down 20%?
   $5.50 - ($5.50 x 20%) = $5.50 - $1.10 = $4.40

4. Your original price for NFL footballs is $25. What is the sale price if you mark it down 50%?
   $25 - ($25 x 50%) = $25 - ($12.50) = $12.50

5. Your original price of a box of file folders for your office is $15.00/box. If you purchase 100 boxes or more, you receive a markdown of 20% per box. If you order exactly 100 boxes, what is your price? $15 – ($15 x 20%) = $15 – (3.00) = $12.00 per box

6. Your original price for the book "Moby Dick" is $15. What is the sale price if you mark it down 25%?
   $15 - ($15 x 25%) = $15 - $3.75 = $11.25

7. Your original price for Résumé consulting services is $75 per hour. What is your sale price if you mark it down 5%?
   $75 - ($75 x 5%) = $75 - $3.75 = $71.25

Markup:

1. Your cost for a pair of dress shoes is $100. What is your selling price if you want to make 75% on each pair?
   $100 + ($100 x 75%) = $100 + $75 = $175

2. Your cost for wallets is $60. What is your selling price if you want to make 80% on each wallet?
   $60 + ($60 x 80%) = $60 + $48 = $108

3. Your cost for replacement ink cartridges is $40. What is your selling price if you want to make 50% on each cartridge?
   $40 + ($40 x 50%) = $40 + $20 = $60

4. Your cost for a used jet-ski is $2,000. What is your selling price if you want to make 200% on each jet-ski?
   $2,000 + (2,000 x 200%) = $2,000 + $4,000 = $6,000

BM41

MARKUP/MARKDOWN EXERCISE
ANSWER KEY (continued)

5. Your cost for curtains is $10. What is your selling price if you want to make 100% on each curtain? If the 100% markup becomes your original price and you want to mark it down 30%, what is the new sale price?
$10 + ($10 x 100%) = $10 + $10 = $20
$20 - ($20 x 30%) = $20 - $6 = $14

6. Your cost for candy is $0.50 a bar. What is your selling price if you want to make 150% on each candy bar?
$0.50 + ($0.50 x 150%) = $0.50 + $0.75 = $1.25

7. Your cost for the book "Treasure Island" is $10. What is your selling price if you want to make 50% on the book?
$10.00 + ($10.00 + 50%) = $10.00 + $5.00 = $15.00

QUANTITY DISCOUNT EXERCISE

1. The regular price for a box of pencils is $2.50. However, there is a 20% discount if you buy 100 or more. What is the total product cost if you buy 200 boxes?

2. The regular price of answering machines is $30. However, there is a 15% discount if you buy 100 or more. What is the total product cost if you buy 100 answering machines?

3. The regular price for desks is $100. However, there is a 10% discount if you buy 10 or more and an additional 10% discount if you buy more than 50. What is the total product cost if you buy 60 desks?

4. The regular price for laptops is $1,500. However, there is a 25% discount if you buy 10 or more. Is it cheaper to buy 8 or 10 laptops? What is the difference in price?

5. The regular price of ink is $2 per bottle. However, there is a 10% discount if you buy 500 or more bottles. Is it cheaper to buy 425 bottles or 500 bottles? What is the difference in price?

6. The regular price of chairs is $25 per chair. However there is a 5% discount if you buy 10 or more chairs and a 30% discount if you buy 25 or more chairs. Is it cheaper to buy 20 or 25 chairs?

7. The regular price for Indianapolis Colts season tickets is $1000 a seat. However, if you buy 4 or more season tickets there is a 20% discount. Four individuals decide to join together to take advantage of the discount. How much money did each person save on their seat?

BM43

QUANTITY DISCOUNT EXERCISE
ANSWER KEY

1. The regular price for a box of pencils is $2.50. However, there is a 20% discount if you buy 100 or more. What is the total product cost if you buy 200 boxes?
    $2.50 - ($2.50 x 20%) = $2.50 - $0.50 = $2
    $2 x 200 = $400

2   The regular price of answering machines is $30.   However, there is a 15% discount if you buy 100 or more. What is the total product cost if you buy 100 answering machines?
    $30 - ($30 x 15%) = $30 - $4.50 = $25.50
    $25.50 x 100 = $2,550

3. The regular price for desks is $100. However, there is a 10% discount if you buy 10 or more and an additional 10% discount if you buy more than 50. What is the total product cost if you buy 60 desks?
    $100 - ($100 x 20%) = $100 - $20 = $80
    $80 x 60 = $4,800

4. The regular price for laptops is $1,500. However, there is a 25% discount if you buy 10 or more. Is it cheaper to buy 8 or 10 laptops? What is the difference in price?
    $1,500 x 8 = $12,000
    $1,500 - ($1,500 x 25%) = $1,500 - $375 = $1,125
    $1,125 x 10 = $11,250
    It is cheaper to buy 10, you save $750.

5. The regular price of chairs is $25 per chair. However there is a 5% discount if you buy 10 or more chairs and a 30% discount if you buy 25 or more chairs. Is it cheaper to buy 20 or 25 chairs?
    $25 - ($25 x 5%) = $25 - $1.25 = $23.75 x 20 =$475
    $25 - ($25 x 30%) = $25 - $7.50 = $17.50 = $437.50, cheaper to buy 25

6. The regular price for Indianapolis Colts season tickets is $1000 a seat. However, if you buy 4 or more season tickets there is a 20% discount. Four individuals decide to join together to take advantage of the discount. How much money did each person save on their seat?
    $1000 x ($1000 x 20%) = $200, that is how much each person saves.

MANUFACTURING EXERCISE

1. Your composite plastic consists of 30% raw material A, 60% raw material B and 10% raw material C. If you want to make 500 pounds of the composite plastic, how many pounds of each raw material are needed?

2. Your composite plastic consists of 25% raw material A, 40% raw material B and 35% raw material C. If you want to make 1,000 pounds of the composite plastic, how many pounds of each raw material are needed?

3. Your composite plastic consists of 20% raw material A, 75% raw material B and 5% raw material C. If you want to make 3,000 pounds of the composite plastic, and you know you will have 20% scrap, how many pounds of each raw material is needed? How much will be scrap?

4. Your composite plastic consists of 30% raw material A, 40% raw material B and 30% raw material C. If you want to make 3,000 pounds of the composite plastic, and you know you will have 10% scrap in the processing of raw material B, how many pounds of each raw material is needed?

5. At **Coastal Metal Fabricators**, they need 22% of their assembly line employees on machine A, 46% on machine B and the rest on machine C. If the company has 100 employees, how many people are needed on each machine?

6. At **Atlas Machinery**, they need 25% of their assembly line employees on machine A, 60% on machine B, and the rest on machine C. If the company has 200 employees, how many are needed on each machine?

BM45

MANUFACTURING EXERCISE
ANSWER KEY

1. Your composite plastic consists of 30% raw material A, 60% raw material B and 10% raw material C. If you want to make 500 pounds of the composite plastic, how many pounds of each raw material are needed?
    Product A = 500 x 30% = 150 pounds
    Product B = 500 x 60% = 300 pounds
    Product C = 500 x 10% = 50 pounds

2. Your composite plastic consists of 25% raw material A, 40% raw material B and 35% raw material C. If you want to make 1,000 pounds of the composite plastic, how many pounds of each raw material are needed?
    Product A = 1,000 x 25% = 250 pounds
    Product B = 1,000 x 40% = 400 pounds
    Product C = 1,000 x 35% = 350 pounds

3. Your composite plastic consists of 20% raw material A, 75% raw material B and 5% raw material C. If you want to make 3,000 pounds of the composite plastic, and you know you will have 20% scrap, how many pounds of each raw material is needed? How much will be scrap?
    Scrap = 3,000 x 20% = 600 pounds
             3,000 + 600 = 3,600 pounds
    Product A = 3,600 x 20% = 720 pounds
    Product B = 3,600 x 75% = 2,700 pounds
    Product C = 3,600 x 5% = 180 pounds

4. Your composite plastic consists of 30% raw material A, 40% raw material B and 30% raw material C. If you want to make 3,000 pounds of the composite plastic, and you know you will have 10% scrap in the processing of raw material B, how many pounds of each raw material is needed?
    Product A = 3,000 x 30% = 900 pounds
    Product B = 3,000 x 40% = 1,200 lbs +10% = 1,320 lbs
    Product C = 3,000 x 30% = 900 pounds

5. At Coastal Metal Fabricators, they need 22% of their assembly line employees on machine A, 46% on machine B and the rest on machine C. If the company has 100 employees, how many people are needed on each machine?
    Machine A = 100 x 22% = 22
    Machine B = 100 x 46% = 46
    Machine C = 100 x 32% = 32 or (100-22-46 = 32%)

6. At Atlas Machinery, they need 25% of their assembly line employees on machine A, 60% on machine B and the rest on machine C. If the company has 200 employees, how many are needed on each machine?
    Machine A = 200 x 25% = 50
    Machine B = 200 x 60% = 120
    Machine C = 200 x 15% = 30 or (200-50-120 = 30)

COUNTING MONEY EXERCISE

Exercises (assume all taxes are included in price unless question asks you to calculate the tax):

1. Stan gives you a $20 bill for an item purchased at $18.06. How much change is he owed?

2. Marylou gives you a $5 and a $1 bill for an item purchased at $5.72. How much change is she due?

3. Avery purchases three items. Item 1 is priced $8.89, item 2 is priced $11.31 and item 3 is priced $8.07. If the customer gives you two $20 bills, how much change is owed to Avery?

4. Myra purchases three items and returns one item. Item 1 is priced $45.08, item 2 is priced $9.67, item 3 is priced $22.09 and the item returned is priced at $79.11. Who is owed money? How much?

5. Linda purchases an item for $5.56. If sales tax is 6%, and she gives you a ten-dollar bill what change you would give her in bills and coins? *

6. Sandra buys two items, one for $18.99 and another for $4.50. If sales tax is 6%, and the customer gives you two twenty-dollar bills, what change would you give her in bills and coins?*

7. Glenn buys three items, one for $8.99, the second one for $6.50 and a third one for $14.50. They also return an item that had a price of $7.50. Calculate the sales tax at 6% on the purchases and returned item. How much money does Glenn owe the store for the transaction?

Note: For Questions 5 & 6: Calculate sales tax on the purchased items and add this figure to the total price of the merchandise; then subtract the grand total from the amount given you.

BM47

COUNTING MONEY EXERCISE
ANSWER KEY

Exercises (assume all taxes are included in price unless question asks you to calculate the tax):

1. Stan gives you a $20 bill for an item purchased at $18.06. How much change is he owed?

    $1.94

2. Marylou gives you a $5 and a $1 bill for an item purchased at $5.72. How much change is she due?

    $0.28

3. Avery purchases three items. Item 1 is priced $8.89, item 2 is priced $11.31 and item 3 is priced $8.07. If the customer gives you two $20 bills, how much change is owed to Avery?

    $11.73

4. Myra purchases three items and returns one item. Item 1 is priced $45.08, item 2 is priced $9.67, item 3 is priced $22.09 and the item returned is priced at $79.11. Who is owed money? How much?

    The customer is owed $2.27

5. Linda purchases an item for $5.56. If sales tax is 6%, and she gives you a ten-dollar bill what change you would give her in bills and coins? *

    Sales tax = $5.56 x .06 = $0.33, they owe $5.89; they get back $4.11, Four $1 bills, a dime and a penny.

6. Sandra buys two items, one for $18.99 and another for $4.50. If sales tax is 6%, and the customer gives you two twenty-dollar bills, what change would you give her in bills and coins?*

    Total product cost = $23.49 x .06 = $1.41 sales tax, total cost = $24.90, change = $15.10, they get a $10 bill, a $5 bill and a dime.

7. Glenn buys three items, one for $8.99, the second one for $6.50 and a third one for $14.50. They also return an item that had a price of $7.50. Calculate the sales tax at 6% on the purchases and returned item. How much money does Glenn owe the store for the transaction?

    Return = $7.50 + ($7.50 x .06) = $7.50 + $0.45 = $7.95;
    Money owed = $8.99 + $6.50 + $14.50 = 29.99 + (29.99 x .06) = 29.99 + 1.80 = 31.79 - $7.95 = $23.84

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- pageBM52 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- pageBM52 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.
<u>Line graphs</u> - to compare how something is performing over time (i.e. sales over the last 12 months).
<u>Bar graphs</u> - to compare different items to each other (i.e. profits of 5 different companies).
<u>Pie charts</u> - 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).

<u>Examples:</u>
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

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

TOPIC E: SOLVING FINANCIAL TASKS WITH EXCEL® SPREADSHEETS

Microsoft Excel is well suited to accomplish financial tasks. Excel includes hundreds of built-in functions that may be used in formulas to reference the data in the spreadsheet cells. Many of these functions specifically deal with common financial calculations. The program is laid out so accessing and customizing these functions is straightforward. You don't need prior knowledge of finance to integrate Excel's financial functions in your problem solving!

Using spreadsheets promotes higher order thinking skills. The spreadsheet tool promotes the development of problem solving skills and supports "What if..." type questions. Some templates have formulas inserted so that students focus on problem solving, while the computer makes the calculations for them. Using ready-made formulas to manipulate numbers, members can then explore how and why formulas are used, and how changing a variable affects the outcome. Members feel the power of spreadsheets as they fill numbers into the cells in a spreadsheet with the click of a mouse. They use formulas to generalize a rule, to make conversions, to calculate budget totals and to calculate ratios.

Members make charts and graphs from spreadsheet records, learning to organize their ideas and present information to an audience. Charts add meaning to information, helping to analyze and interpret data, as they identify the maximum and minimum, mean, median and mode of a data set. The computer can generate bar graphs, line graphs and pie charts. Pie charts reinforce the idea of percentages as these are represented visually, and help students compare ratios.

Allow yourself to practice and to play on the computer, and remember, you are in a "risk free environment", where errors can be easily corrected or edited.

Try implementing changes with font, size and colors, adding borders and adding Clip Art.

EXCEL® CHECKBOOK EXERCISE

	A	B	C	D	E	F	G
1							
2				**cell F4**		**Beginning**	
3						**Balance**	**cell F8**
4							
5							
6	**Check**	**Date**	**Description**	**Payment /**	**Deposit /**	**Balance**	
7	**Number**			**Debit**	**Credit**		
8						0.00	
9						0.00	
10						0.00	
11						0.00	
12						0.00	cell F9
13						0.00	
14						0.00	
15						0.00	
16						0.00	
17						0.00	
18						0.00	
19						0.00	
20						0.00	
21						0.00	

Instructions for Checkbook:

1. In row 6, type the following (column A cell A6 - Check), (B cell B6 - Date), (C cell C6 Description), (D cell D6 - Payment), (E cell E6 - Deposit), (F cell F6 - Balance).
2. In row 7, type the following (column A cell A7 - Number), (D cell D - Debit), (E cell E7 - Credit).
3. In cell F2, type Beginning. In cell F3, type Balance.
4. In cell F4, enter the beginning balance of **$500.00**
5. In cell F8, enter the following formula =F4-D8+E8.
6. In cell F9, enter the following formula =F8-D9+E9.
7. Click on cell F9 and select copy, then click on cell F10 and copy down for the desired amount of cells, then select paste or enter.
8. Now, pay some bills, spend some money, and make sure you add a few paychecks or deposits!
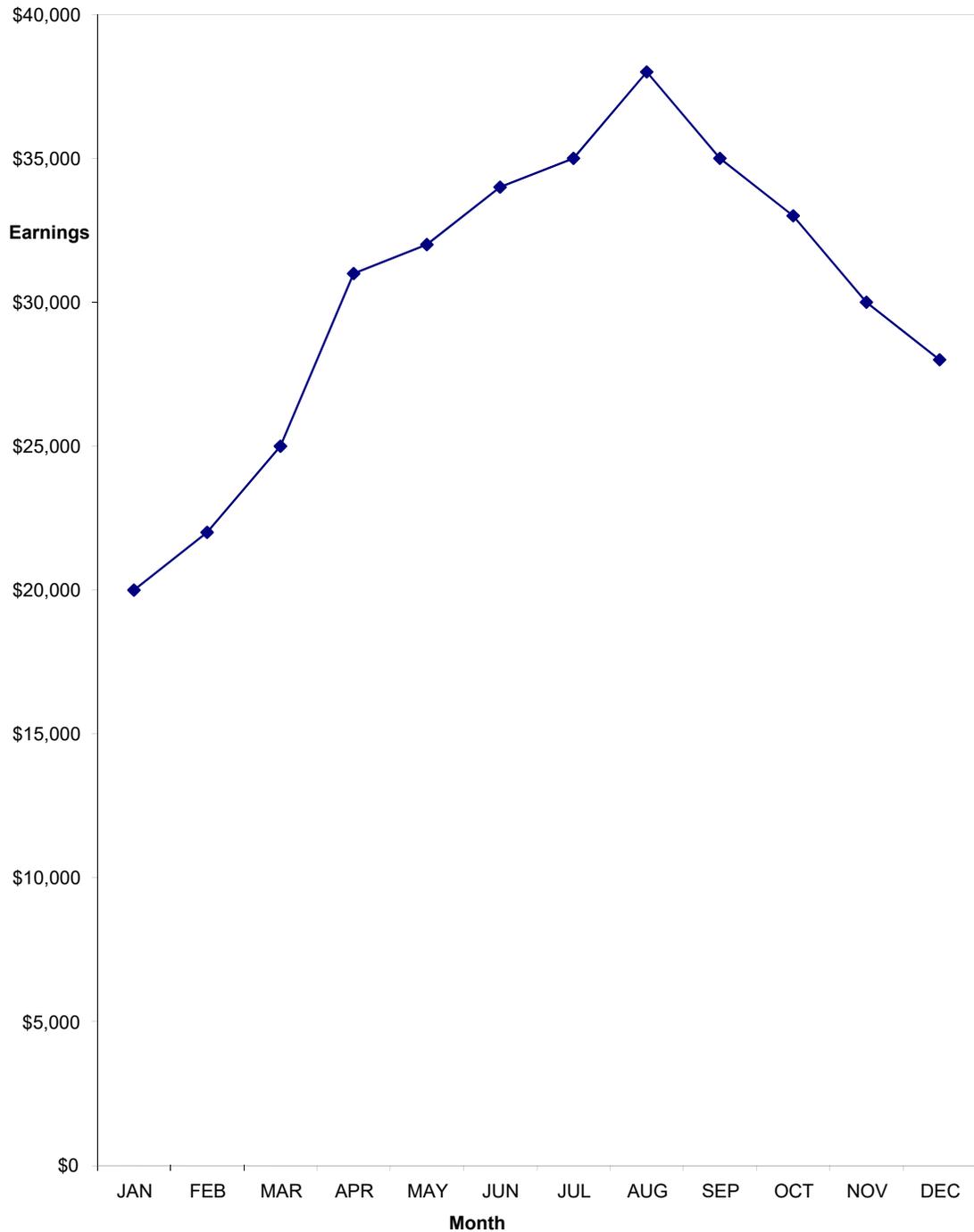
Happy calculating!

BM53

TOPIC F: GRAPHS AND CHARTS

LINE GRAPH HANDOUT

A line graph is used to compare how something is performing over time (i.e. sales over the last 12 months)
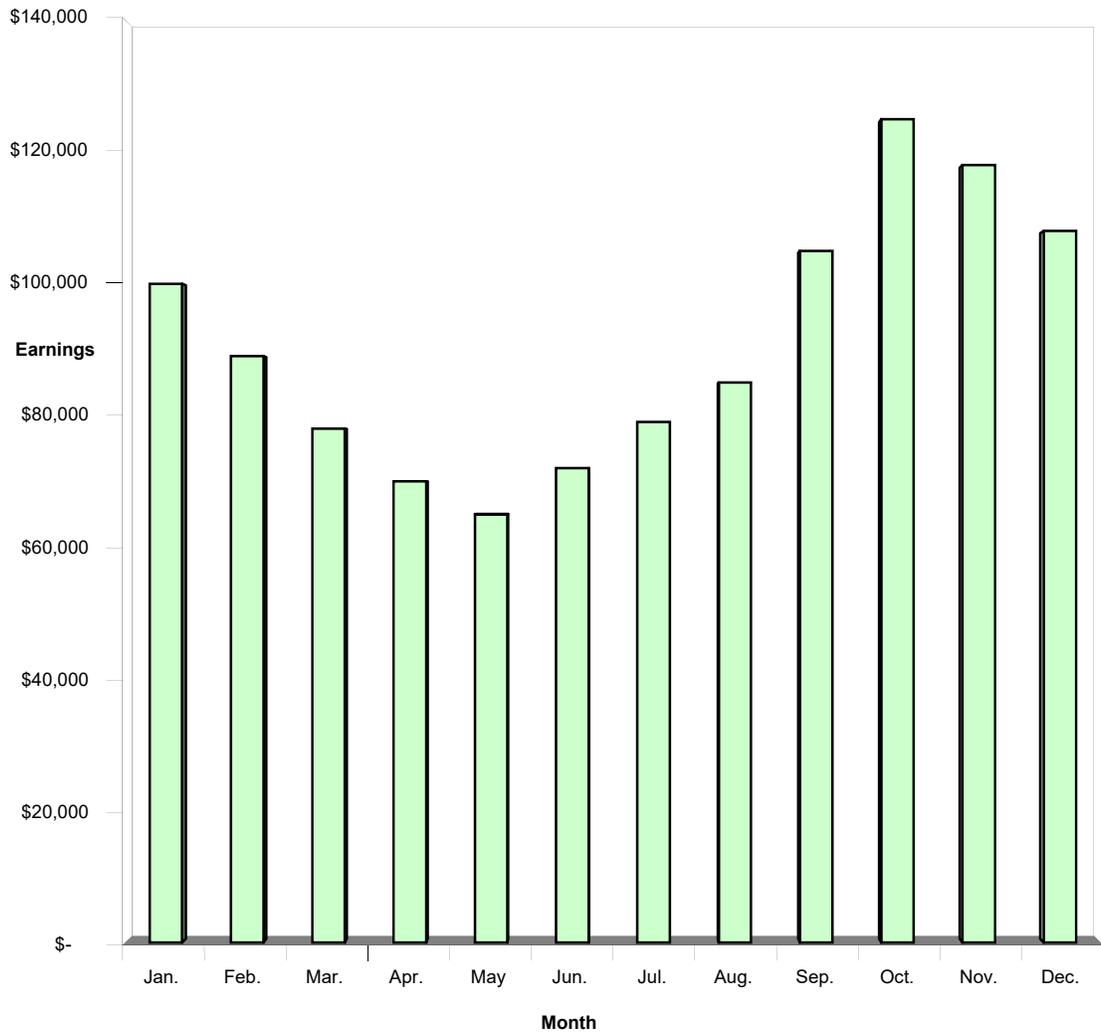
SALES BY MONTH
Year: 2015

BM54

BAR GRAPH HANDOUT

A Bar Graph is used to compare different items to each other (i.e. profits of different companies or specific items.).
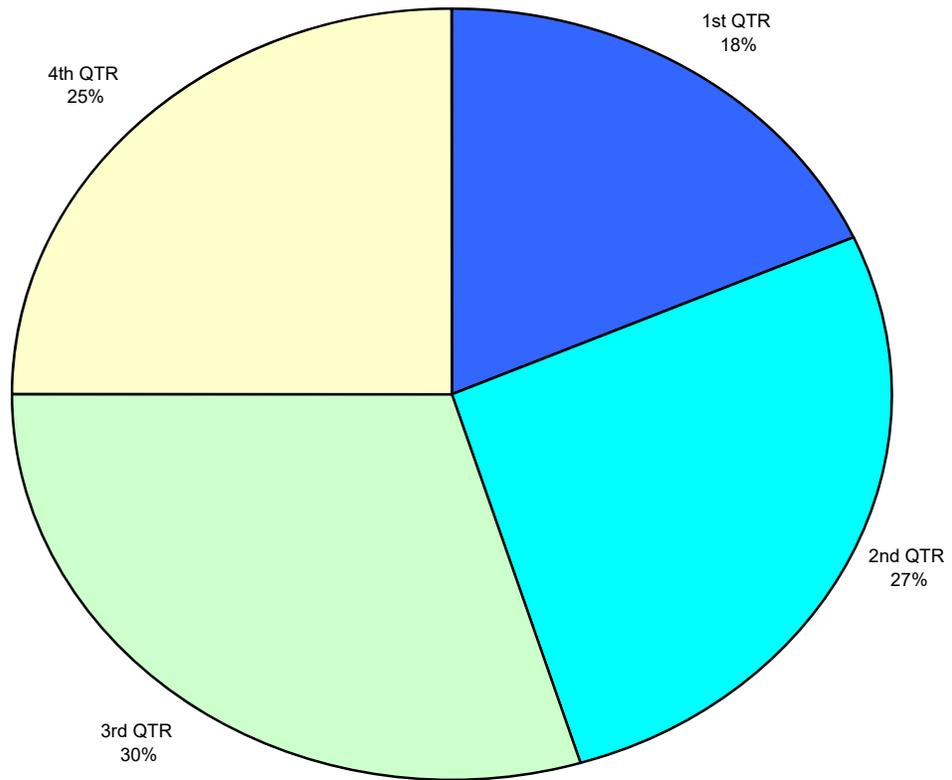
SALES BY MONTH
Year: 2015

BM55

Revision 8.1

Work Certified™ 1.2016

PIE CHART HANDOUT
A Pie Chart is used to compare items to each other proportionately (i.e., sales per quarter)

Sales by Quarter
Year: 2015

1st QTR
18%

4th QTR
25%

2nd QTR
27%

3rd QTR
30%

BM56

Revision 8.1

Work Certified™ 1.2016

GRAPH EXERCISE

A company's earnings for the 12 months in the current year were:

Jan.	$100,000
Feb.	$89,000
Mar.	$78,000
Apr.	$70,000
May	$65,000
Jun.	$72,000
Jul.	$79,000
Aug.	$85,000
Sep.	$105,000
Oct.	$125,000
Nov.	$118,000
Dec.	$108,000

(1) Graph the monthly earnings using a line graph.
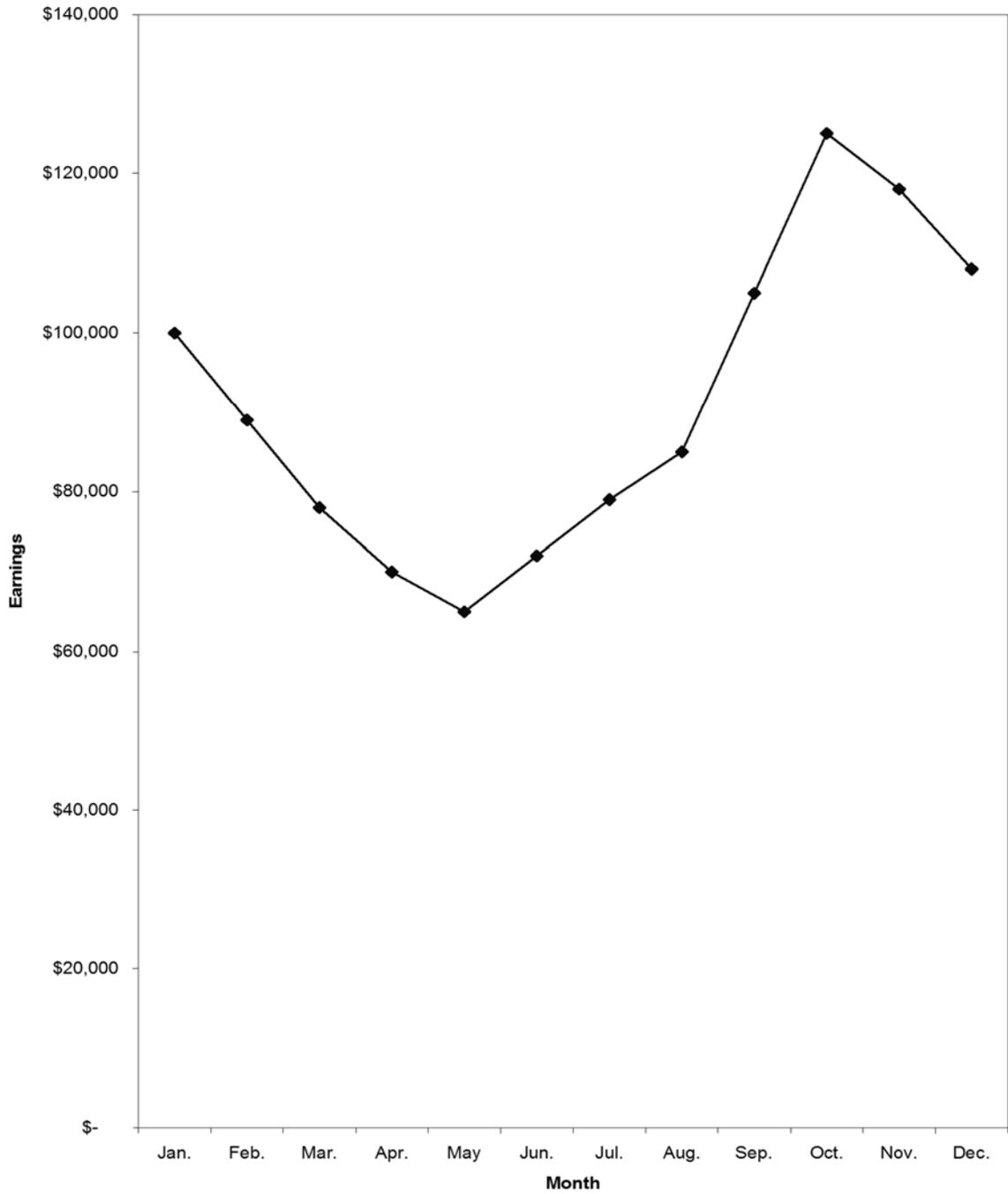
(2) Graph the monthly earnings using a bar graph.

The earnings by quarter were:

First quarter:	$267,000	about 24%
Second quarter:	$207,000	about 19%
Third quarter:	$269,000	about 25%
Fourth quarter:	$351,000	about 32%

(3) Graph the quarterly earnings using a pie chart.

BM57

LINE GRAPH

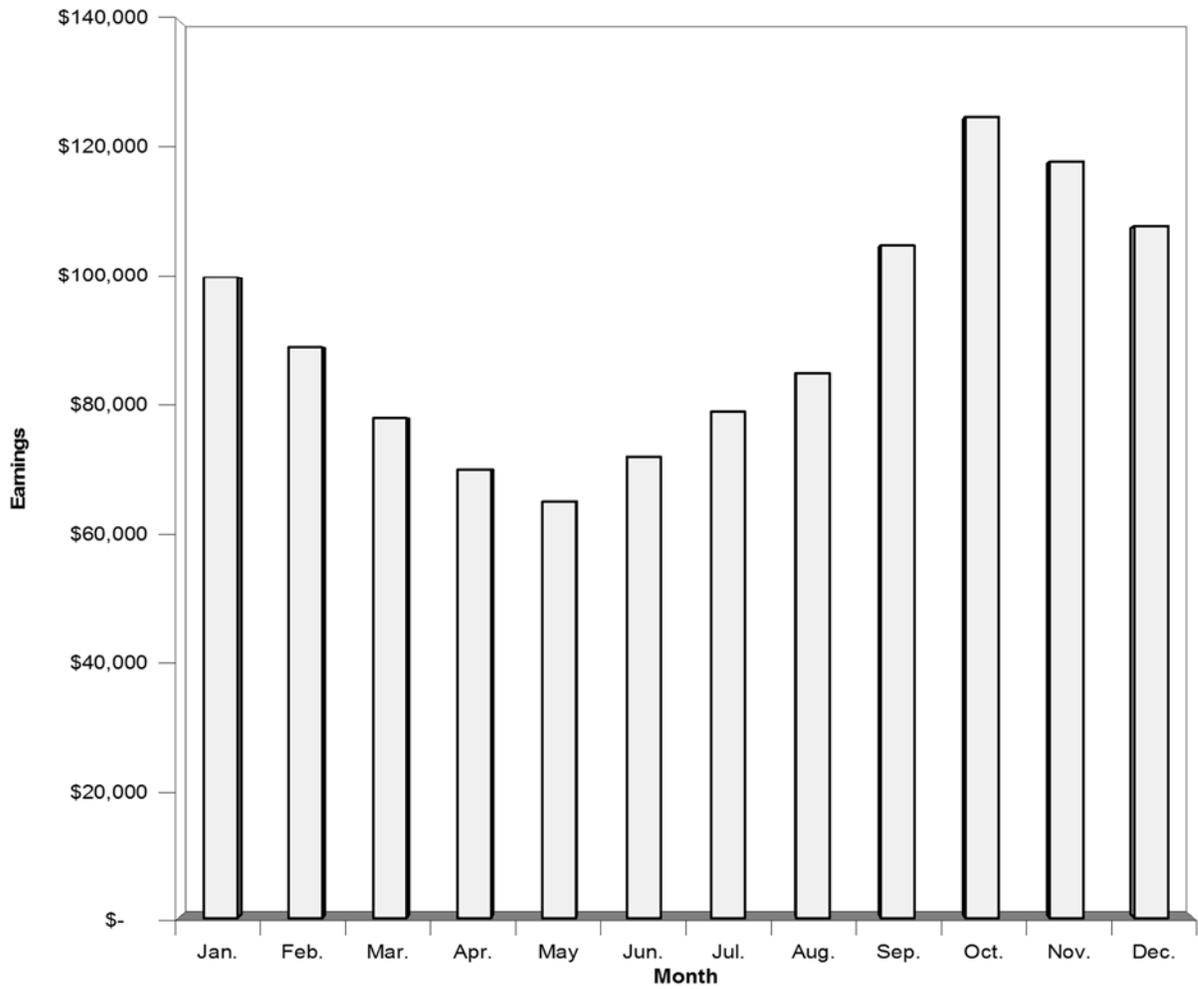## EXERCISE ANSWER
Monthly Earnings

BM58

BAR GRAPH

EXERCISE ANSWER
Monthly Earnings

BM59