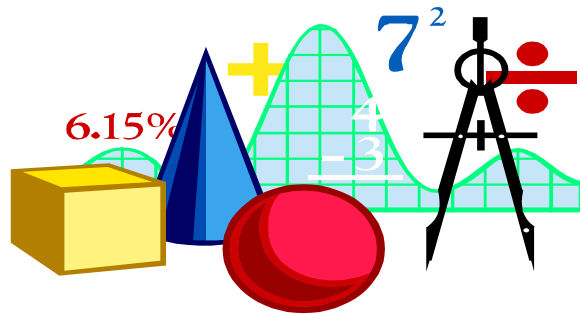


SOMETIMES LIFE IS A MATH PROBLEM



COMPETENCY

CATEGORY: Basic Skills

CATEGORY

NUMBER: D.25

COMPETENCY: Perform mathematical calculations.

OBJECTIVE: Upon completion of this module, students will be able to perform the following calculations:

1. Arithmetic: addition, subtraction, multiplication, division
2. Calculate percentages.
3. Calculate circumferences and areas.
4. Solve geometric problems.
5. Convert units of measure using a conversion chart.
6. Find information using a chart or graph.
7. Solve basic algebraic equations.



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INDEX

RESOURCE	SPECIALIST	STUDENT (# PER)	PAGE
Learning Activity D.25-1 <ul style="list-style-type: none"> • One deck of cards for every two students • Paper and pencil (pen) to keep score • One deck of cards for every two students 			22
Learning Activity D.25-2 <ul style="list-style-type: none"> • Paper and pencil • Work Sheet—“A Quick Check” 			24 25
Learning Activity D.25-3 <ul style="list-style-type: none"> • Work Sheet—“Business Multiplication and Division” 			28 29
Learning Activity D.25-4 <ul style="list-style-type: none"> • A variety of measuring devices - rulers, measuring tape and string • An assortment of round (paper plate, jar top, etc.), square, rectangular and multi-sided objects of different sizes 			30
Learning Activity D.25-5 <ul style="list-style-type: none"> • Pen • Work Sheet—“Shopping” 			32 33
Learning Activity D.25-6 <ul style="list-style-type: none"> • Paper and pen • Poster board and markers • Work Sheet—“The Survey Says...” 			36 37
Learning Activity D.25-7 <ul style="list-style-type: none"> • Work Sheet—“Sea Attack” • “Ocean Battle Area” playing graph for each student 			41 42 44
Learning Activity D.25-8 <ul style="list-style-type: none"> • Paper and pencil 			45
Pre-Assessment/Post-Assessment			47
Answer Key—Pre-Assessment/Post-Assessment			50

INTRODUCTION

- State module topic and review module objective.
- Discuss the title “Sometimes Life is a Math Problem.” Use this discussion to brainstorm a list of “life problems” that are math related.
- What are some of the ways people try to cope or get around using math? What are some of the consequences?
- If our class is 60 minutes long and we have just used 10 minutes discussing this, we only have ____ minutes left in this class period to learn and or review how to solve life’s math problems. (Actual figures may vary) Emphasize (tongue-in-cheek) that for some of them, this is an important calculation.

Administer Pre-Assessment

OUTLINE

- A. Arithmetic: Addition, subtraction, multiplication, division
1. These skills are useful for calculating purchases, scores, time, recipes, lengths, areas, paychecks, taxes, etc.
 2. Our number system uses the digits 0 through 9 to represent values.
 3. To represent a value higher than 9, a combination of these digits are used and placed in columns - one’s, ten’s, hundreds, thousands, etc.

Note to Specialist: Put a long number on the board and show your students the column positions of each of the digits. Go at least through the 10 millions position.

4. When performing arithmetic calculations, it is important to write the numbers with each of the digits in the correct column. To help keep the digits in the correct column, either draw light

vertical lines and or place zeros in the numbers to keep your columns straight. Only place zeros to the *left* of a number.

Example:

Add: 231 and 13 (13 becomes 013)

$$\begin{array}{r} 231 \\ \underline{013} \end{array}$$

Starting from the right and working left; $1 + 3 = 4$. Write down the 4 in the one's column. $3 + 1 = 4$. Write down the 4 in the 10's column. $2 + 0 = 2$. Write down the two in the 100's column. Your answer is 244.

5. When working word problems, watch for key words to be able to tell which operation to use. Words like: and, plus, in addition, sum, total or in, all indicate that addition is likely to be used.

Terms like less, difference, minus, smaller, fewer and left over, indicate subtraction is likely to be used.

Multiplication and division often use similar terms to addition and subtraction. "Of" is often used with multiplication and division (Ex.: 3 "of" something).

B. Addition

1. Write all of the numbers to be added in a column, making certain to keep digits in the right column. Draw a line under the last number.
2. Beginning at the top of the right hand column, add the digits in that column, one after the other, from top to bottom.
3. If the total is 9 or less, write the answer in the same column just under the line at the bottom of the problem. If the total is 10 or more, you will need to "carry."
4. To "carry" means to write the right-hand digit of the total in the answer space for the column you are adding; then, write the

left-hand digit at the top of the column that is next to and to the left of the one you are adding. Include that digit when you are adding that column.

Example:

Add: 27 and 38

$$\begin{array}{r} 1 \\ 27 \\ \underline{38} \\ 65 \end{array}$$

Notice that 7 and 8 are 15. You write down the 5 in the ones column and carry the 1 to the tens column. The 1 is included when adding the digits in the tens column.

Note to Specialist: Perform several calculations like this on the board and have the students walk you through the calculation. Stress the importance of the concept of “carrying.”

5. Follow the same procedure when adding the ten, hundreds, thousands, etc. columns.

C. Subtraction

1. Since we will not deal with negative numbers (numbers less than 0), in this unit we will follow a rule - when subtracting, you must subtract the smaller number from the larger.
2. Write down two numbers placing the smaller number under the larger, being careful to line up the columns correctly.
3. Starting at the right hand column, subtract the digit in the bottom number from the digit above it in the same column.
4. If the digit on top is larger than the bottom, remember to “borrow.”

Example: Subtract 6 from 24

$$\begin{array}{r} 24 \\ -06 \\ \hline \end{array}$$

The 4 becomes 14 and the 2 becomes 1. 6 from 14 is 8; 0 from 1 is 1. Write the answers in the correct column and the answer is 18.

$$\begin{array}{r} 24 \\ -06 \\ \hline 18 \end{array}$$

5. If there are zeros in the top number, you might have to borrow from two columns over or “borrow twice.”

Example: 302 minus 148 =

$$\begin{array}{r} ^9 \\ 2 \\ \hline 3 2 \\ -1 8 \\ \hline 1 4 \end{array}$$

In this case there was nothing to borrow from the tens column, so the tens column borrowed “1” from the hundreds column. The 3 in the hundreds column became 2 and the zero in the tens column became 10. *Now*, the tens column has something from which to borrow, so the ones column borrows “1” from the tens column. The 10 in the tens column becomes 9 and the 2 in the ones column becomes 12. Now you can subtract! 302 minus 148 = 154.

COMPLETE LEARNING ACTIVITY D.25-1
“KEEPING SCORE”

COMPLETE LEARNING ACTIVITY D.25-2
“A QUICK CHECK”

D. Multiplication

1. In order to multiply effectively, you must memorize the multiplication tables... at least through the 12's.
2. Line up the two numbers to multiply, one directly under the other. If there are decimals in the numbers, write them in the number, but it does not effect how you line up the numbers.

Example: 34.5 times 7.14

$$\begin{array}{r} 34.5 \\ \times 7.14 \\ \hline \end{array}$$

3. To multiply numbers with two or more digits, you will use multiplication and addition.
4. Start multiplying from the right. Follow the same procedure as addition if there is a need to carry.
5. You will multiply the top number by every digit in the bottom number. Place the result under the line (and or previous result) making certain to line up the result so that the right hand digit in the result is in the same column as the number you used to multiply.

Example:

$$\begin{array}{r} 34.5 \\ \times 1.14 \\ \hline 1380 \\ 345 \\ 345 \end{array}$$

6. To get the final product (the answer to a multiplication problem), add up the results.

$$\begin{array}{r} 34.5 \\ \times 1.14 \\ \hline 1380 \\ 345 \\ 345 \\ \hline 39330 \end{array}$$

7. The final step is to place the decimal in the product. Count the number of digits that are to the right of the decimal place in the two numbers being multiplied. There are three...the five in 34.5 and the one and four in 1.14. Starting from the right of the product, count back the number of columns, in this case, three. So, the final product is **39.33**

E. Division

1. Division answers the question “How many groups of a certain number can be made from a larger number.”
2. Division also requires the knowledge of the multiplication tables. Division is actually the reverse of multiplication.

Example: $9 \times 3 = 27$; 27 divided by $3 = 9$

3. The number being divided is called the dividend.
4. The number used to divide is called the divisor.
5. In long division, a cycle of division begins with **dividing** the divisor into the first numbers of the dividend that will allow a one-digit whole number.

Example: $15 \overline{)7950}$

6. The next step is to **multiply** the first digit of the answer (called the quotient) by the divisor and placing the answer under the digits of the divisor being divided.

Example:
$$\begin{array}{r} 5 \\ 15 \overline{)7950} \\ \underline{75} \end{array}$$

7. Next, subtract the numbers placed under the dividend.

Example:
$$\begin{array}{r} 5 \\ 15 \overline{)7950} \\ \underline{75} \\ 4 \end{array}$$

8. The fourth step is to **bring down** the next digit to the right and place it on the right of the number resulting from subtraction.

Example:
$$\begin{array}{r} 5 \\ 15 \overline{)7950} \\ \underline{75} \\ 45 \end{array}$$

9. Look at the number resulting from bringing the digit down from the dividend and divide the divisor into it to begin the cycle over again.

10. When there is nothing to bring down, you are done.

Example:
$$\begin{array}{r} 530 \\ 15 \overline{)7950} \\ \underline{75} \\ 45 \\ \underline{45} \\ 00 \\ \underline{00} \end{array}$$

F. Calculate percentages

1. Percentages actually means “per one hundred.” A percentage is actually a fraction with the denominator of “100.”

Example: $39\% = 39/100 = .39$

2. To determine a percentage of another value, multiply that number by the decimal or fraction equivalent of the percentage.

Example: 25% of $60 =$

$$\begin{array}{r} 60 \\ \times .25 \\ \hline \end{array} \quad \text{or} \quad 60 \times 25/100 =$$

3. To determine what percentage a number (number A) is of another number (number B), divide number A by number B.

Example: What percentage is 4 of 16?

$$4/16 = .25 = 25\%$$

Example: What percentage of 25 is 10?

$$10/25 = .4 = 40\%$$

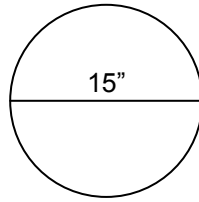
<p style="text-align: center;">COMPLETE LEARNING ACTIVITY D.25-3: “BUSINESS MULTIPLICATION AND DIVISION”</p>

G. Calculate circumferences and areas

1. To calculate the circumference of a shape with straight sides, add the lengths of all sides.
2. To calculate the circumference of a circle, use the formula:

$C = \Pi d$ where Π equals a value of 3.14 and “d” equals the diameter of the circle.

Example:

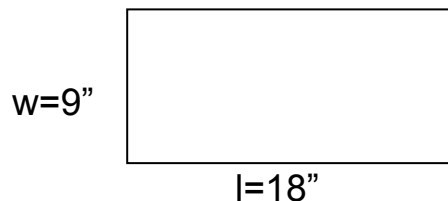


$$C = \Pi(15'')$$
$$C = 3.14(15'')$$
$$C = 47.1''$$

The diameter of the circle is the distance of a line from one side of the circle, passing through the center, to the other side of the circle.

Sometimes, a measurement of the radius of the circle is given. This is a straight line from the center of the circle to a side of the circle. In this case, the diameter would equal 2 times the radius ($D = 2r$).

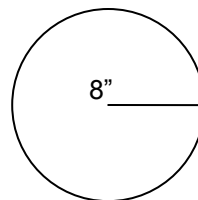
3. To calculate the area of a square or rectangle, multiply the length of the figure by the width.



$$A = lw$$
$$A = 9'' \times 18''$$
$$A = 162 \text{ sq. in.}$$

4. To calculate the area of a circle, square the radius and multiply the answer by Π . To square means to multiply the number by itself.

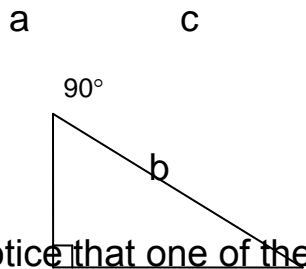
$$A = \Pi r^2$$
$$A = \Pi(8^2)$$
$$A = 3.14(64'')$$
$$A = 200.96 \text{ sq. in.}$$



H. Pythagorean Theorem for right triangles - $a^2 + b^2 = c^2$

1. A right triangle is a triangle in which one of the angles is 90° .

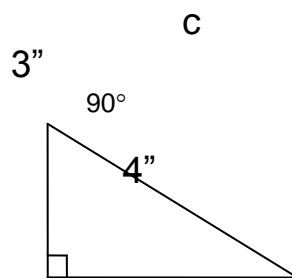
Example:



Notice that one of the sides is named "a." Another is named "b." But, the side opposite the right (90°) angle is always side "c."

What the Pythagorean Theorem says is that if you know the length of any two of the sides of a right triangle, you can calculate the length of the third side.

Example:

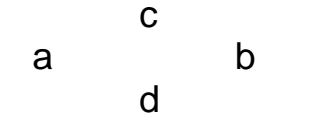


$$\begin{aligned} a^2 + b^2 &= c^2 \\ 3^2 + 4^2 &= c^2 \\ 9 + 16 &= c^2 \\ 25 &= c^2 \\ 5 &= c \end{aligned}$$

I. Lines and angles

1. Lines in a square are equal.
2. Lines opposite each other in a rectangle are equal.
3. The angles in any four-sided figure will total 360° .
4. The angles in any triangle will total 180° .

5. When two lines intersect, opposite angles are equal.



Angles a & b are opposite and equal.
Angles c & d are opposite and equal.

COMPLETE LEARNING ACTIVITY D.25-4
“THE SHAPE OF THINGS”

J. Units of measure

1. Often two different units of measurement are used to measure the same item or material. For example, liquids may be measured in ounces, pints, quarts or gallons.
2. Being able to convert the different units of measure to the same unit enables you to accurately compare the two measures and compare amounts, prices etc.
3. Weights:
 - a. 16 ounces (oz.) = 1 pound (lb.)
 - b. 2000 pounds = 1 ton
4. Measures:
 - a. 16 oz. = 1 pint
 - b. 2 pints = 1 quart
 - c. 8 oz = 1 cup
 - d. 2 cups = 1 pint

- e. 2 pints = 1 quart
- f. 4 quarts = 1 gallon
- g. 12 inches (in.) = 1 foot (ft.)
- h. 3 ft. = 1 yard (yd.)
- i. 1,760 yds. = 1 mile

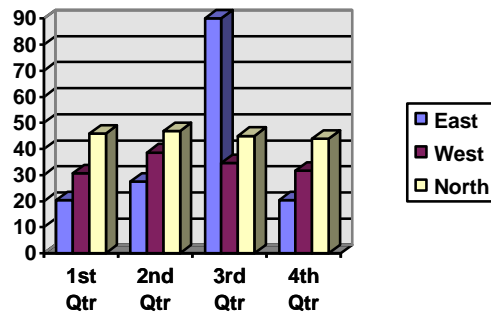
COMPLETE LEARNING ACTIVITY D.25-5 “SHOPPING”

K. Using charts and graphs

1. A chart is information grouped together in such a way as to give meaning or relationship to the information. Outlines, tables and graphs are examples of charts.
2. A graph uses visual elements or *graphics* to communicate the relationship of facts or data.
3. Three common types of graphs are: bar graph, line graph and pie graph.
 - a. Bar graph - values are communicated by the length of the bar that represents certain data. The basic structure of a bar graph is a vertical line on the left with values plotted out. This is often referred to as the “y” axis. In addition, a horizontal line on the bottom is drawn and the position of items or categories are plotted. This is often the “x” axis.

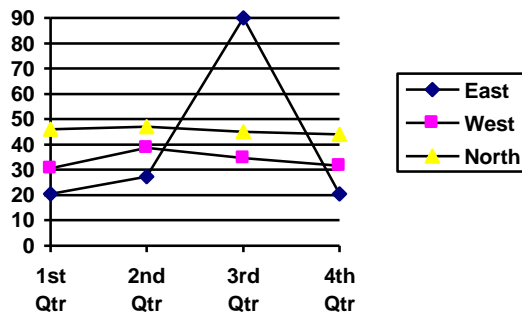
The intersection of a line drawn upward from an item on the “x” axis with a horizontal line from the “y” axis to the top of the bar indicates the value of the bar to be the same as the point at which the horizontal line passes through the “y” axis.

Example:



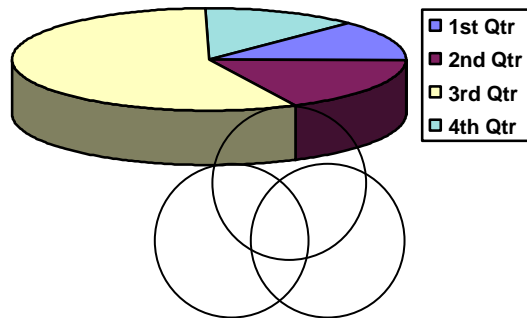
- b. Line graph - a graph in which changing values are represented by a line on a graph grid. The structure of a line graph is the same as that of a bar graph. To determine a value for any point along the “x” axis, draw a vertical line up from the “x” axis at that point, up to the line, then horizontally to the “y” axis. The value indicated on the “y” axis at the point the horizontal line crosses it, is the value of the item indicated on the “x” axis.

Example:



- c. Pie graph - a circular graph in which amounts or values are represented as a proportionate size of the circle... or “slice of the pie.” This graph is particularly useful for indicating percentages.

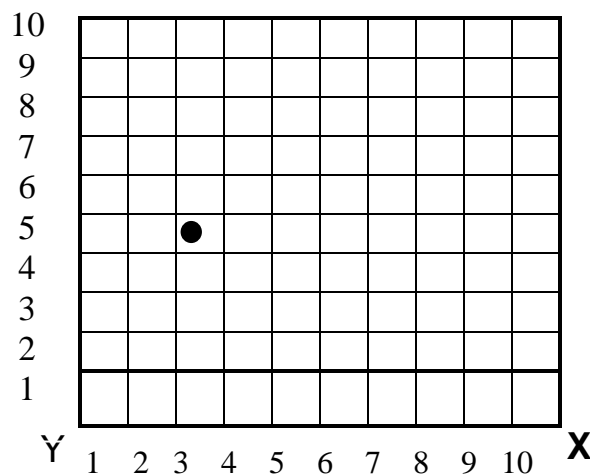
Example:



4. Other types of graphs are grids and Venn graphs.

- a. Grid - much the same as graph paper or a spreadsheet. A grid usually has the same structure as a bar graph or line graph with values plotted out equally on the both the “x” and “y” axis

Example:



Notice the point that is indicated on the grid. It has an “x” value of 3 and a “y” value of 5. The location of a point on a grid is expressed (x, y); or in this case (3, 5).

- b. Venn graph - graph consisting of two or more circles. The circles represent a group (data, people, things, etc.) that have a particular characteristic and overlap to show the relationship between the groups



Areas that overlap represent the amount of each group that have all of the characteristics of the circles overlapping. In the circles above, the area “o” shows the amount that has the characteristics of all three circles, A, B and C.

COMPLETE LEARNING ACTIVITY D.25-6
“THE SURVEY SAYS...”

COMPLETE LEARNING ACTIVITY D.25-7
“SEA ATTACK”

L. Solving algebraic equations

1. Equations - simple algebraic equations deal with the same kinds of math problems as arithmetic; but, are usually written horizontally instead of vertically.

Example: Instead of:

$$\begin{array}{r} 3 \\ +2 \\ \hline \end{array}$$

You would write: $3 + 2 =$

And, instead of leaving the space after the equal sign, you would write a letter to indicate that is the amount or value you want to calculate. As long as it is a letter, the amount is *unknown*. We often call the letter the “unknown,” and say that we are solving for the unknown. The letter can be any letter, but the most common letter used is “x.”

The algebraic equation for the above problem would be:

$$3 + 2 = X$$

2. However, the “x” doesn’t always find itself alone on one side of the equation. It is common to see something like:

$$X - 2 = 3$$

It is probably easy to “solve for x” in the example above. The same principles that make it easy, will make it easy to solve other algebraic equations that don’t look as easy.

Example: $4(X+3)+5 = X+7$

3. Properties: things you can do to an equation to make it faster or easier to solve.
- a. Commutative property - you can change the order of numbers when adding or multiplying.

Example:

$$15 + 37 = X \text{ is the same as } 37 + 15 = X$$
$$ab = X \text{ is the same as } ba = X$$

- b. Associative property - similar to commutative property; Numbers are often grouped by parenthesis. The associative property allows you to change how numbers are grouped when adding or multiplying.

Example: $(105+17)+30=X$ is the same as
 $105+(17+30)=X$

$$5x(12x8)x21=X \text{ is the same as}$$
$$5x12x(8x12)=X$$

- c. Distributive property - this property says that if a group put together by parenthesis is multiplied by a number, then every number included inside the parenthesis must

be multiplied by that number in order to remove the parenthesis from the group.

Example: $7(21+8)=X$ is the same as
 $(7 \times 21) + (7 \times 8) = X$

$2(12-5)=X$ is the same as
 $(2 \times 12) - (2 \times 5) = X$

This property is helpful because sometimes the way an equation is written out makes it easier or more difficult to work. A person might experiment with this property if working with a problem with which it is difficult to “get started.” It is also useful in separating or isolating the “x” or unknown. (See Section 5. Isolating the Unknown below).

4. Order of operation - when calculating a long equation, the order of operations tells you what to do first. To help you remember the “order,” remember this sentence - “Please Excuse My Dear Aunt Sally.”

Take the first letter from each of the words of the sentence:

P, E, M, D, A, S

These letters will remind you of these operations and in this order:

Parenthesis, Exponents, Multiply, Divide, Addition, Subtraction

When solving equations, take care of the operations inside the parenthesis first, then exponents, then multiplication, etc.

5. Isolating the unknown
 - a. The key to solving an algebraic equation is to isolate the unknown (or letter you are “solving for”) on one side of the equation.

- b. First, simplify the equation by completing all of the arithmetic possible (if any).
- c. Next, begin to remove everything on the side of the equation with the “x” except the “x” by reversing or undoing the operation of the numbers. **But**, whatever you do to one side of the equation, you must do to the other.

Example: $X-5=12$

In this case, the 5 needs to be removed from the side of the equation with the X. Since the 5 is subtracted, you must *add* a five in order to reverse or undo the “-5.” **But**, remember to do the same thing to the other side:

$$X-5+5=12+5$$

Complete the arithmetic to get:

$$X=17$$

Another example:

$$3X=45$$

In order to isolate the X, you must remove the 3. The 3 is multiplied by X. In order to reverse it, you need to divide by 3. Remember, both *sides* must be divided.

$$3X/3=45/3$$

Complete the arithmetic to get:

$$X=15$$

COMPLETE LEARNING ACTIVITY D.25-8
“TEAM COMPETITION”

Administer Post-Assessment

LEARNING ACTIVITY D.25-1
“KEEPING SCORE”

OBJECTIVE: To demonstrate the ability to add and subtract mentally, including carrying to the next column and borrowing

RESOURCES:

- One deck of cards for every two students
- Paper and pencil (pen) to keep score
- One deck of cards for every two students

SUGGESTED TIME: 45 minutes

DIRECTIONS:

1. Divide the class into pairs and pass out one deck of cards to each pair.
2. Explain how to play the game using the following directions.
3. This game is much like the game of “21” or Blackjack. Each pair will pick their own number to use instead of 21. The number must fall between 35 and 45.
4. Cut the cards to begin. High card goes first.
5. The first player draws cards from the top of the deck and gives the total of the cards value out loud. For example if the first card is “7,” the first player would say, “seven.” If the next card is five, the first player would say “twelve.” Each player must draw a minimum of three cards, but may draw more.
6. Cards hold the following values: 2 through 10 have the value of the number on the card; face cards have a value of 10; aces have a value of either 1 or 11 (players choice); and jokers have a value of either 10 or 0 (players choice).
7. The goal is to get the total as close to the identified number as possible without going over. Once the player is as close as they feel

is comfortable, they stop drawing cards and the other player begins to draw cards.

8. The goal of the other player is to get a total higher than that of the first player without going over the identified number. Tie goes to the first player.
9. After each round of play, record who won the round. The most number of rounds won wins the game.
10. For added challenge, increase the identified number (for example: 80 to 100)
11. After approximately 10 minutes change the structure of the game so that subtraction is used instead of addition. Begin with the number that was identified and subtract the value of the card drawn from that number. Subtract the value of the next card from the remainder... and so on. The goal of this approach is to get the value of the number down to "0" without going below.

LEARNING ACTIVITY D.25-2
“A QUICK CHECK”

OBJECTIVE: To demonstrate the ability to set up addition and subtraction problems and calculate the result including carrying to the next column and borrowing

RESOURCES:

- Work Sheet—Learning Activity D.25-2
- Paper and pencil

SUGGESTED TIME: 10 to 15 minutes

DIRECTIONS:

1. Allow the students to work with a partner or by themselves.
2. Pass out a copy of the work sheet for Learning Activity D.25-2 to each student.
3. When the students are finished, review the answers.

LEARNING ACTIVITY D.25-2
“A QUICK CHECK”
WORK SHEET

DIRECTIONS: Set the following questions up into a problem and solve (work) the problem for the correct answer.

1. Jim, Seth and Jeremy all bought tickets to different rock concerts for the weekend. Seth spent \$18.50, Jim spent \$21.00 and Jeremy spent \$32.00. How much did they spend total?

2. Find out everyone's age in the class and add them up.

3. Get four driver's license numbers or student ID numbers and add them.

4. Think of what you had to eat the last three times you went to a fast food restaurant. Uses the prices of the food or estimates and add up your total bill.

5. Estimate the ages of all of your teachers. How many years of experience are working for you?

6. Get four people together. Gather all of your change. Add the total of the change collected. Return money to the owners.

7. If there are 180 school days in a year, how many days do you have left before this year is over?

8. On the fiftieth floor of a very large office building, 36 people get on the elevator. As the elevator goes down people leave the elevator. On the 49th floor, one person gets off. On the 48th floor, two people leave. On the 47th floor, three people exit... and so on. At what floor will the elevator be empty?

9. You have \$100.00 and you are CD shopping. CD's cost \$5.50, \$6.75, \$8.99, \$9.50, \$11.98, \$13.75, \$14.98 and \$21.50. None of the CD's you buy cost the same. How many CD's can you buy? How much will you have left over?

10. You start out the day with \$35.00. You meet five people during the day that need to borrow money from you. The first one borrows \$1.00 and the other four each borrow twice as much as the one before them. How much do you have left at the end of the day?

LEARNING ACTIVITY D.25-3
“BUSINESS MULTIPLICATION AND DIVISION”

OBJECTIVE: To demonstrate their understanding of multiplication and division calculations in the business and industry

RESOURCES: Work Sheet—Learning Activity D.25-3 for each student

SUGGESTED TIME: 1 hour

DIRECTIONS:

1. Pass out copies of the work sheet for Learning Activity D.25-3.
2. Plan a day and time for students to report their findings to the class.

LEARNING ACTIVITY D.25-3
“BUSINESS MULTIPLICATION AND DIVISION”
WORK SHEET

DIRECTIONS:

1. Contact a business person (employer, friend, etc.) and ask them to identify 3 ways in which multiplication and division is used in their business and give an example of each.
2. Ask how important multiplication and division is in his/her business.

1 2 3 4 5
Not important Some importance Important Very important Most important

3. If the businessperson rated the above question as a “4” or “5”, ask which math skill is the *most* important to him/her.

Report to the class.

4. At the assigned time, tell the class the responses the businessperson gave you, making certain to *demonstrate* the examples he/she cited in #1 above.
5. When in doubt, check it out! Just to make certain that you have confidence in multiplication and division, solve the following problems:

a.
$$\begin{array}{r} 37 \\ \times 5 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 346 \\ \times 7 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 41 \\ \times 34 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 1853 \\ \times 48 \\ \hline \end{array}$$

e. 5748 divided by 6 =

f. 4524 divided by 78 =

g. What is 60% of 300?

h. 15 is what percent of 25?

LEARNING ACTIVITY D.25-4
“THE SHAPE OF THINGS”

OBJECTIVE: To demonstrate the ability to calculate circumference, perimeter, and area

RESOURCES:

- A variety of measuring devices - rulers, measuring tape and string
- An assortment of round (paper plate, jar top, etc.), square, rectangular and multi-sided objects of different sizes

SUGGESTED TIME: 1 hour

DIRECTIONS:

1. Divide the class into pairs.
2. Pass out at least one round and one square or multi-sided object to each pair.
3. Pass out rulers or measuring tape and string to each pair.
4. Each pair should use the ruler or measuring tape to determine the diameter and radius of the circular object.
5. Use the formula $C=2\pi r$ or $C=\pi d$ to determine the circumference of the object.
6. Use the string to measure the circumference by carefully laying the string along the outer edge of the object. (This will take teamwork from the pair.)
7. Measure the length of the string. How does the measure compare with the length obtained from using the formula?
8. Measure the perimeter of the square, rectangular or multi-sided object. Look for short-cuts.

9. Use the formula's $A=\pi r^2$ and $A=lw$ to determine the area of the objects.
10. Next divide the class into two teams for a project. Working as teams and using the measuring devices and formula's given, the students are to calculate the perimeter of the school building. This will take some organization. As an option, you might have the two teams race against each other.
11. As a bonus activity or a marathon for the above, have the students use the Pythagorean Theorem to calculate a diagonal line of the door to the classroom. Check the results by using a measuring tape to actually measure diagonally.

LEARNING ACTIVITY D.25-5
“SHOPPING”

OBJECTIVE: To demonstrate the ability to convert units of measure for the purpose of comparing price per unit

RESOURCES:

- Work Sheet—Learning Activity D.25-5
- Pen

SUGGESTED TIME: 2 hours

DIRECTIONS:

1. This activity is more fun if students complete it by working together in 2's or 3's.
2. Students should be assigned to go to a grocery store or department store and find at least 3 examples of like items that are sold using different units of measure to give the quantity. (Instruct the students to avoid items like alcoholic beverages or cigarettes.)
3. Using the work sheet for Learning Activity D.25-5, the students should convert the units of measure so that both items are using the same unit of measure.
4. Students should divide the price by the number of units to get the price per unit of measure.
5. Students should report their findings and review their calculations with the class.

LEARNING ACTIVITY D.25-5
“SHOPPING”
WORK SHEET

Example 1:

First item:

Product name and brand: _____

Quantity listed on the product: _____

Price: _____

Second item:

Product name and brand: _____

Quantity listed on the product: _____

Price: _____

DIRECTIONS: Take at least one of the items and convert the units of measure so it is the same as the other (ex. 1lb 5oz. = 21oz). In some cases, you may have to convert both of the items (1lb 6oz. and 2lbs 9oz. = 22oz. and 31 oz.)

Divide the price by the number of units. (Ex: 22 oz of a product for \$6.16 would = \$.28 per oz.)

Enter the price per unit: Item 1: _____

Item 2: _____

Example 2:

First item:

Product name and brand: _____

Quantity listed on the product: _____

Price: _____

Second item:

Product name and brand: _____

Quantity listed on the product: _____

Price: _____

DIRECTIONS: Take at least one of the items and convert the units of measure so it is the same as the other (ex. 1lb 5oz. = 21oz). In some cases, you may have to convert both of the items (1lb 6oz. and 2lbs 9oz. = 22oz. and 31 oz.)

Divide the price by the number of units. (Ex: 22 oz of a product for \$6.16 would = \$.28 per oz.)

Enter the price per unit: Item 1: _____

Item 2: _____

Example 3:

First item:

Product name and brand: _____

Quantity listed on the product: _____

Price: _____

Second item:

Product name and brand: _____

Quantity listed on the product: _____

Price: _____

DIRECTIONS: Take at least one of the items and convert the units of measure so it is the same as the other (ex. 1lb 5oz. = 21oz). In some cases, you may have to convert both of the items (1lb 6oz. and 2lbs 9oz. = 22oz. and 31 oz.)

Divide the price by the number of units. (Ex: 22 oz of a product for \$6.16 would = \$.28 per oz.)

Enter the price per unit: Item 1: _____

Item 2: _____

LEARNING ACTIVITY D.25-6
“THE SURVEY SAYS...”

OBJECTIVE: To gather data from employers and communicate the information in the form of a graph

RESOURCES:

- Work Sheet—Learning Activity D.25-6 for each student
- Paper and pen
- Poster board and markers

SUGGESTED TIME: 2 hours

DIRECTIONS:

1. Pass out copies of the work sheet for Learning Activity D.25-6 to each student and direct them to meet with an employer to gather data by recording the employer’s responses to the questions on the form.
2. After the surveys are completed, total the responses on the Survey Summary Form and make copies for each student.
3. Then, divide the class into small groups to create graphs that will represent the information gathered.
4. Assign one of the pieces of information to each group.
5. The group needs to select the most appropriate type of graph for the data (bar, pie, line, venn, chart).
6. The group should create a large graph on poster board to present to the class.

LEARNING ACTIVITY D.25-6
“THE SURVEY SAYS...”
WORK SHEET

DIRECTIONS: Meet with an employer and record his/her responses to the following questions.

1. How many years of experience did you have when you first became an employer?

2. What do you believe is a “good wage” for someone starting out in this business?

3. Rank the following worker characteristics from 1 to 5, 5 being the most important for your business or industry, 4 being the next most important, and so on...

_____ Reliability

_____ Positive attitude

_____ Honesty

_____ Academic ability

_____ Work ethic

4. How many hours per day should an employer expect to work?

5. In your (the employer's) opinion, how much per hour does an employee need to make in order to live on their own? (State the least amount.)

SURVEY SUMMARY FORM

Item 1:

Record the years of experience:

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Suggestions: Find the total, average, order from least to greatest.

Item 2:

Record the wage suggestions:

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Suggestions: Find the total, average, order from least to greatest.

Item 3:

Add the total for each of the characteristics: (For example if the survey were only of three employers and they rated "attitude" as: 3,5 and 4), then the total would be 12)

_____ Reliability	_____ Positive attitude
_____ Honesty	_____ Academic ability
_____ Work ethic	

Item 4:

Record the hours per day

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Suggestions: Find the total, average, order from least to greatest.

Item 5:

Record suggested wages:

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Suggestions: Find the total, average, order from least to greatest.

**LEARNING ACTIVITY D.25-7:
“SEA ATTACK”**

OBJECTIVE: To demonstrate their ability to identify coordinates on a graph using (x, y) reference

RESOURCES:

- Work Sheet— Learning Activity D.25-7
- “Ocean Battle Area” playing graph for each student

SUGGESTED TIME: 30 minutes

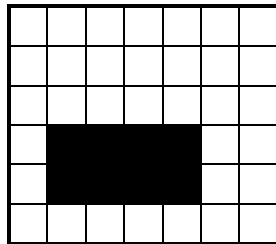
DIRECTIONS:

1. Pass out the directions for “Sea Attack” and “Ocean Battle Area” to each student.
2. Go over the directions with the students.
3. Divide the students into pairs.
4. Have extra copies of the “Ocean Battle Area” in case of mistakes or re-matches.
5. After a playing time, find out: Who won, with the fewest “shots fired?” Were all of the shots recorded correctly?

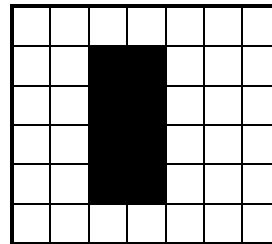
LEARNING ACTIVITY D.25-7
“SEA ATTACK”
WORK SHEET

DIRECTIONS: Sea Attack is much like the game of Battleship in that you will place different ships at different locations in the “Ocean Battle Area.” The objective is to guess the location of your enemies ships and fire a shot (by giving the coordinates) to take out his/her fleet.

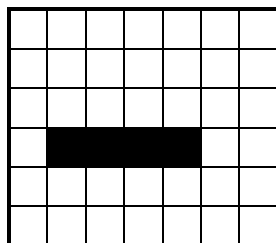
1. Each player should receive the “Ocean Battle Area”. You should draw in the location of each ship in your fleet on this graph. *(Do not let your opponent see where you have placed your ships!)*
2. Each player should place two battleships, two aircraft carriers and two submarines. Each of those crafts is different shapes and sizes and takes up different amounts of squares on the graph.
 - a. An aircraft carrier is 2 squares by 4 squares and may look like this:



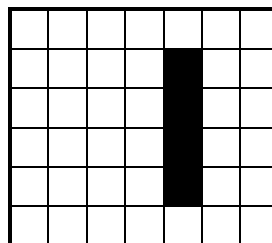
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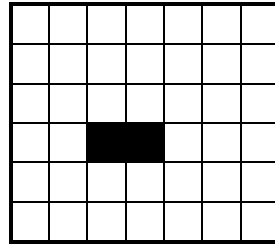
- b. A battleship is 1 square by 4 squares and may look like this:



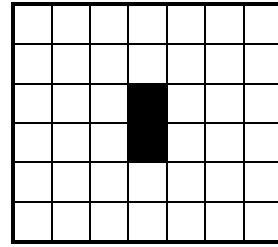
or



c. A submarine is 1 square by 2 squares and may look like this:



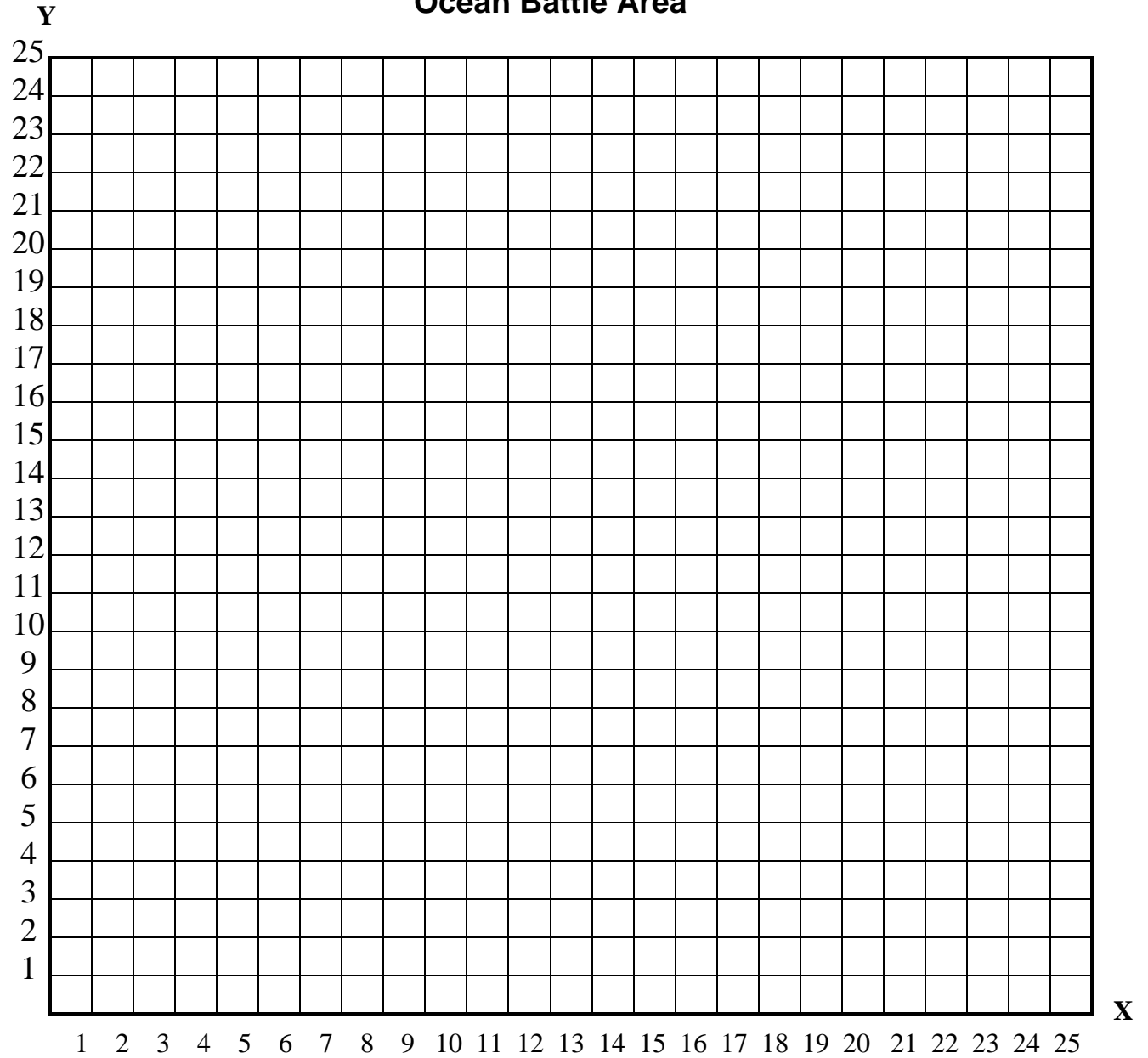
or



3. Remember, the ships must be either horizontal or vertical in the “Ocean Battle Area.” Once the ships are placed, decide who will take the first shot. A shot is taken by calling out the (x,y) coordinates of the exact spot at which you are aiming.
4. If the coordinates are included in the area of any ship on the opponent’s battle area, that ship is sunk. And, the player firing the shot gets to fire another shot. Shots are fired until that player misses.

(Hint: It is wise to keep a record of all of the shots you fired.)
5. If a shot misses a ship, the player being fired upon must put an “x” on the coordinate that has been fired upon on his/her “Ocean Battle Area.”
6. A player wins when all of the ships have been sunk. If the game must end before all ships have been sunk, you may keep score with the following values: Aircraft carriers = 100 pts.; Battleships = 200 pts.; submarines = 300 pts. This is also a useful option to score keeping if multiple games or rounds are played.

Ocean Battle Area



LEARNING ACTIVITY D.25-8
“TEAM COMPETITION”

OBJECTIVE: To demonstrate the ability to solve basic algebraic problems

RESOURCES: Paper and pencil

SUGGESTED TIME: 45 minutes

DIRECTIONS:

1. Divide the class into two teams.
2. Each team will create a ten-problem math test for the other team (including a key).
3. Each problem must be able to be solved using the material covered in section “L” of this module.
4. Numbers included in the problems (before solved) may not contain numbers larger than five digits.

Note to Specialist: Check the problems before they are given to the other team to make certain they are appropriate.

5. Each team should get a copy of the test prepared by the other team. An option is for them to write their test on the board.
6. Every person must take the test for their team.
7. The tests are returned to the team that wrote the test and graded.
8. After all of the tests for that team have been graded, average the scores. This average will be the *team grade*.
9. The team with the highest team grade wins.

Note to Specialist: This activity is more successful when rewards or prizes are offered - to both the winning team and 2nd place team.

PRE-ASSESSMENT POST-ASSESSMENT

DIRECTIONS: Complete the following math problems. Be sure to show your work.

1. Add the following:

$$\begin{array}{r} 23 \\ +86 \\ \hline \end{array}$$

$$\begin{array}{r} 354 \\ +894 \\ \hline \end{array}$$

$$\begin{array}{r} 3459 \\ +8177 \\ \hline \end{array}$$

2. Subtract the following:

$$\begin{array}{r} 867 \\ - 78 \\ \hline \end{array}$$

$$\begin{array}{r} 9427 \\ - 339 \\ \hline \end{array}$$

$$\begin{array}{r} 985437 \\ - 76548 \\ \hline \end{array}$$

3. Multiply the following:

$$\begin{array}{r} 54 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 845 \\ \times 73 \\ \hline \end{array}$$

$$\begin{array}{r} 94858 \\ \times 185 \\ \hline \end{array}$$

4. Divide the following:

a. 45 divided by 3 =

b. 520 divided by 8 =

c. 188,475 divided by 21 =

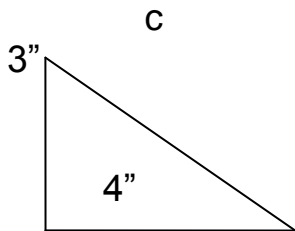
5. What is 25% of 60?

6. What percentage of 75 is 15?

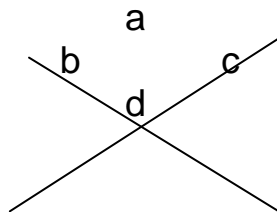
7. What is the circumference and area of a circle that has a radius of 4”?

8. What is the perimeter and area of a rectangle that measures 8’ by 5’?

9. What is the length of side “c” of the following right triangle?



10. Which angles of the following are equal?



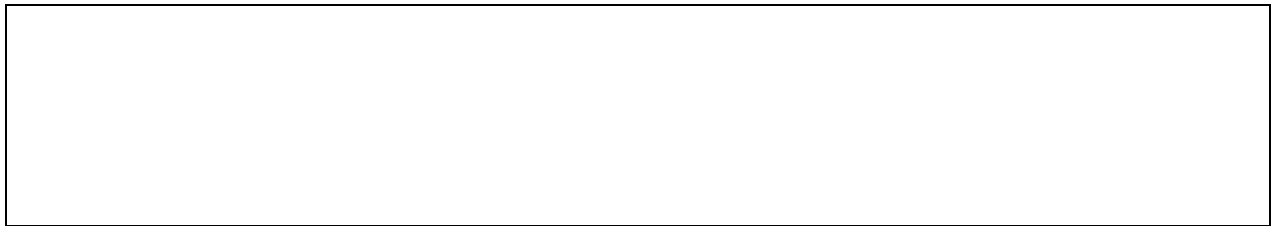
11. How many ounces are in:

a. a cup _____

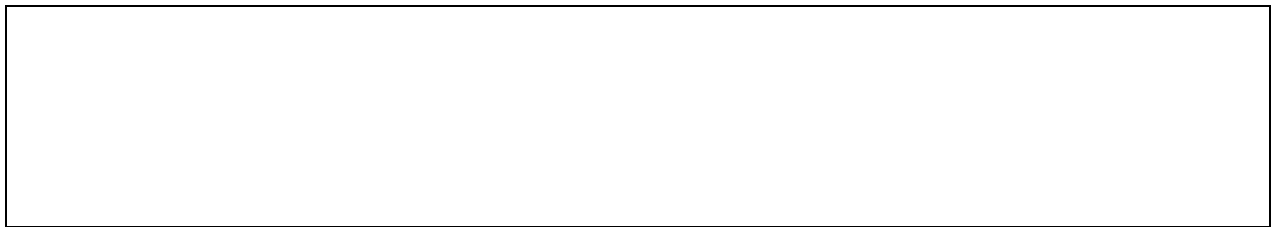
b. a pound _____

c. a quart _____

12. Draw a pie graph that represents the male/female ratio of this class.



13. Draw a graph that shows the coordinates (3,5) and (7,8).



14. Solve for "X"

a. $X-5=12$

b. $3x+15=75$

c. $4(7X-12)=7X-6$

ANSWER KEY

PRE-ASSESSMENT POST-ASSESSMENT

1. Add the following:

$$\begin{array}{r} 23 \\ +86 \\ \hline 109 \end{array}$$

$$\begin{array}{r} 354 \\ +894 \\ \hline 1248 \end{array}$$

$$\begin{array}{r} 3459 \\ +8177 \\ \hline 11,636 \end{array}$$

2. Subtract the following:

$$\begin{array}{r} 867 \\ - 78 \\ \hline 789 \end{array}$$

$$\begin{array}{r} 9427 \\ - 339 \\ \hline 9088 \end{array}$$

$$\begin{array}{r} 985437 \\ - 76548 \\ \hline 908889 \end{array}$$

3. Multiply the following:

$$\begin{array}{r} 54 \\ \times 2 \\ \hline 108 \end{array}$$

$$\begin{array}{r} 845 \\ \times 73 \\ \hline 61685 \end{array}$$

$$\begin{array}{r} 94858 \\ \times 185 \\ \hline 17,548,730 \end{array}$$

4. Divide the following:

a. $45 \text{ divided by } 3 = 15$

b. $520 \text{ divided by } 8 = 65$

c. $188,475 \text{ divided by } 21 = 8975$

5. What is 25% of 60?

15

6. What percentage of 75 is 15?

20%

7. What is the circumference and area of a circle that has a radius of 4”?

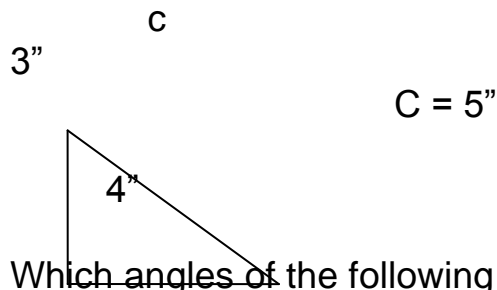
Circumference = 25.13”

Area = 50.27 sq. in.

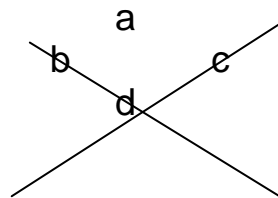
8. What is the perimeter and area of a rectangle that measures 8' by 5'?

Perimeter = 26'; Area = 40 sq. ft.

9. What is the length of side "c" of the following right triangle?



10. Which angles of the following are equal?



a and d; b and c

11. How many ounces are in

a. a cup 8 oz.

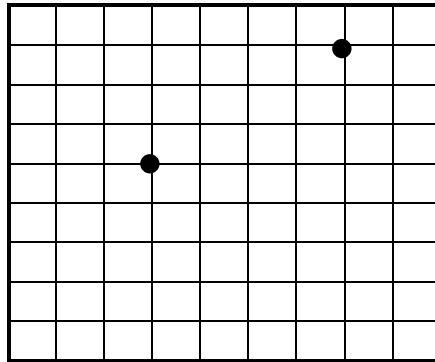
b. a pound 16 oz.

c. a quart 32 oz.

12. Draw a pie graph that represents the male/female ratio of this class.

Answers will vary

13. Draw a graph that shows the coordinates (3,5) and (7,8).



14. Solve for "X"

a. $X-5=12$

$$X = 17$$

b. $3x+15=75$

$$x = 20$$

c. $4(7X-12)=7X-6$

$$X = 2$$

ANSWER KEY
LEARNING ACTIVITY D.25-1

- Answers will vary

ANSWER KEY
LEARNING ACTIVITY D.25-2

1. \$71.50
2. Answers will vary
3. Answers will vary
4. Answers will vary
5. Answers will vary
6. Answers will vary
7. Answers will vary
8. 42nd floor
9. 8 CD's, \$7.05
10. \$4.00

ANSWER KEY
LEARNING ACTIVITY D.25-3

- Answers will vary

When in doubt, check it out:

- | | |
|---------|--------|
| a. 185 | e. 958 |
| b. 2422 | f. 58 |

c. 1,394

g. 180

d. 88,944

h. 60%

ANSWER KEY
LEARNING ACTIVITY D.25-4

- Answers will vary

ANSWER KEY
LEARNING ACTIVITY D.25-5

- Answers will vary

ANSWER KEY
LEARNING ACTIVITY D.25-6

- Answers will vary

ANSWER KEY
LEARNING ACTIVITY D.25-7

- Answers will vary

ANSWER KEY
LEARNING ACTIVITY D.25-8

- Answers will vary