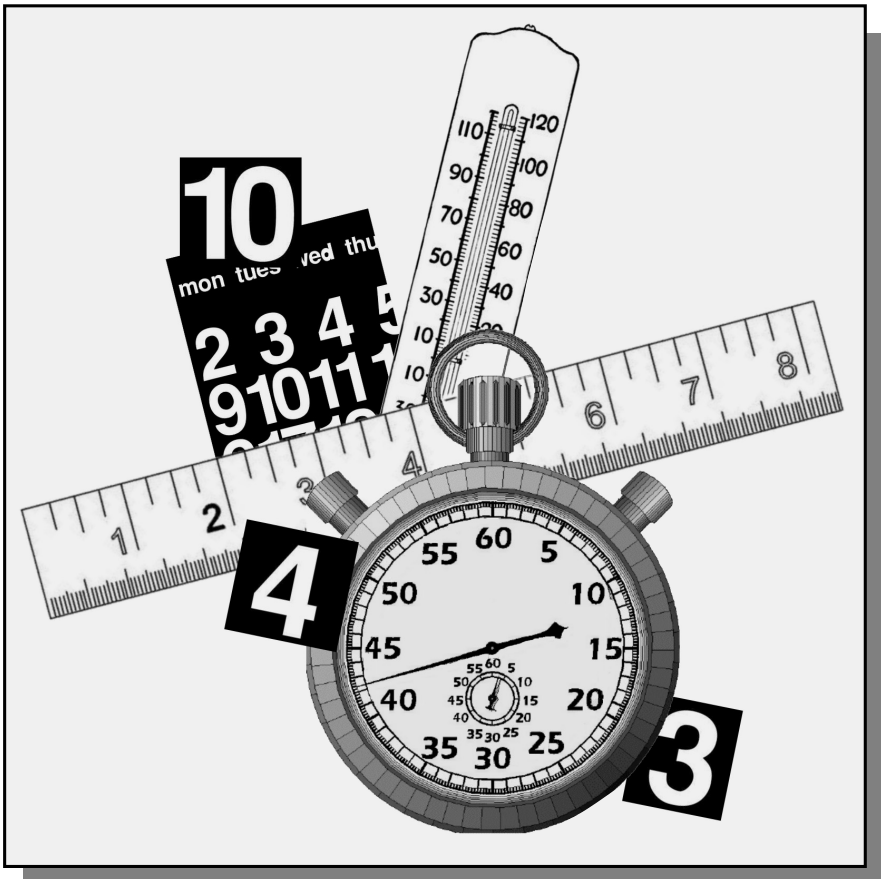
Basic Math Skills

Activities



Chapter 3

BMS: 76037 Revision: 10-15-2007

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Basic Math Skills

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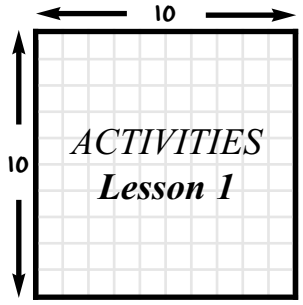
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Graphs

Graphs



You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. A type of mathematical picture is a _____.

2. A ***graph*** shows relationships between _____ of _____.

3. Graphs come in all shapes, but the most common are _____, _____, _____ or _____ graphs.

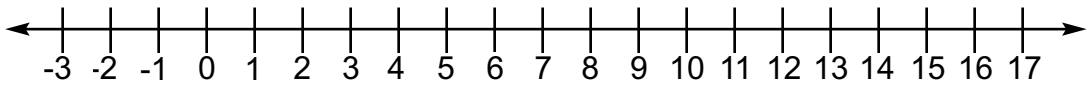
4. Newspapers contain graphs showing _____ and _____ of the ***stock market***.

5. A pie graph is in the geometric shape of a(n): _____.
(a) circle (b) rectangle (c) triangle (d) octagon

6. The simplest type of graph is a line graph called a _____.

7. A number line consists of a single _____ line with _____.

8. On the number line below, show with a dot the following ***points*** (position on the graph of the numbers given): 2, 5, 10, 12



9. In problem #8 (above), the origin of the graph is located at what point? _____
(a) -3 (b) -2 (c) -1 (d) 0

10. A number on a graph is represented by a _____.
(a) tick mark (b) line (c) dot (d) magnitude

11. To locate a point in two _____, you would use the Cartesian coordinate system.

12. The Cartesian coordinate system consists of two _____ number lines.

13. The ***horizontal*** base number line of the Cartesian coordinate system is called the _____ and the vertical base line is called the _____.

14. An _____ names the point in a Cartesian coordinate system.

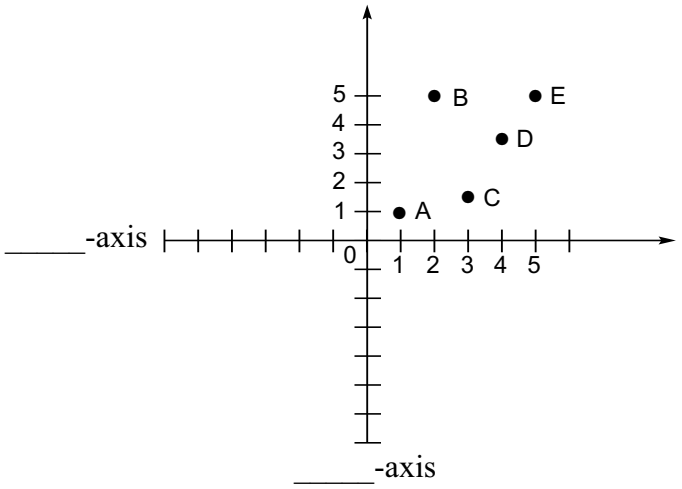
15. When locating, placing or naming ordered pairs in the Cartesian system, tick marks are counted first on the x-axis and then on the y-axis. _____
(a) True or (b) False

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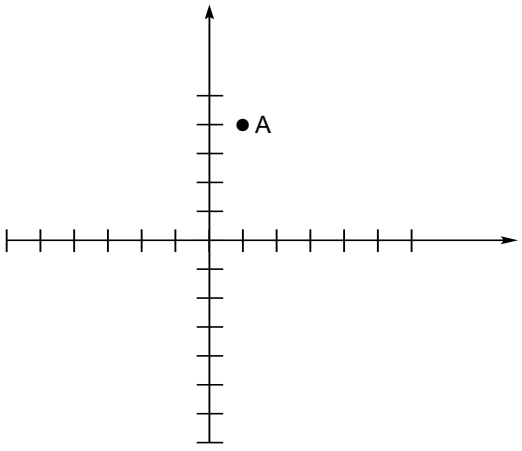
16. In Figure 1.1, the ordered pair that names point E is _____.

17. To make a line graph in the Cartesian coordinate system, you must connect the points with a _____.

18. In the graph below, label the base lines (axes), then give the ordered pair for each of the points (A, B, C, D, E).
A _____; B _____; C _____; D _____; E _____



19. On the grid below, draw a line graph by marking and then connecting the following points: A(1, 4), B(3, 2), C(4, 5), and D(6, 3). (A line graph is plotted left to right, just like reading a printed page.) The first point A(1, 4) is plotted for you.



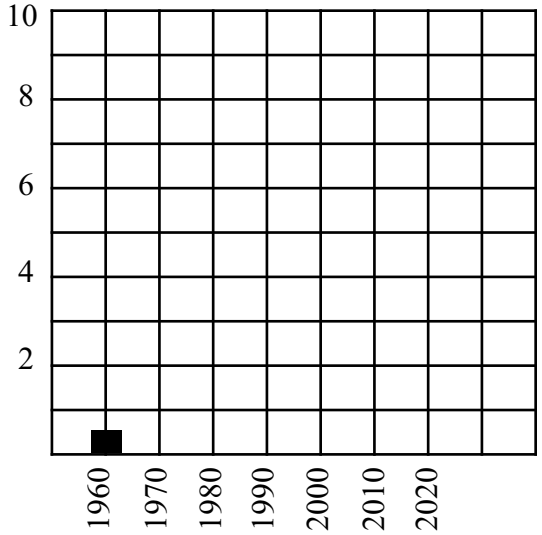
20. A graph consisting of bars or columns is called a _____.

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21. On the grid below draw a column graph to show the information from the following table. The first year, *A*, is drawn for you.

INCOME OF THE AJACK COMPANY

Year		Amount in Millions
A.	1960	$\frac{1}{2}$
B.	1970	2
C.	1980	$3\frac{1}{3}$
D.	1990	5
E.	2000	$5\frac{3}{4}$



22. Which of the following sequences best shows the estimated fractional increase from one decade to the next on the chart above? _____

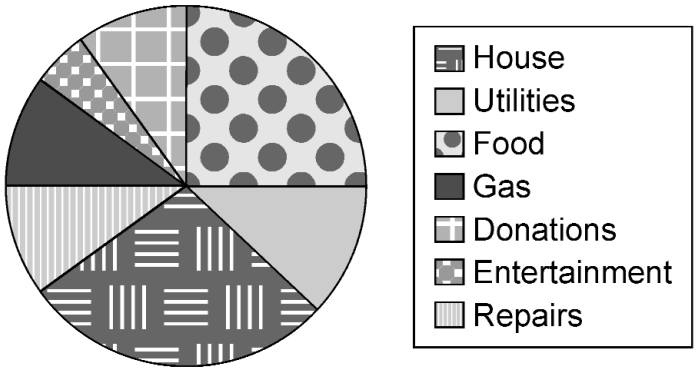
(a) $1\frac{1}{3}$, $1\frac{3}{4}$, $1\frac{1}{4}$, $\frac{3}{4}$ (c) $1\frac{3}{4}$, $1\frac{1}{2}$, $1\frac{1}{4}$, $\frac{3}{4}$

(b) $1\frac{1}{2}$, $1\frac{1}{4}$, $1\frac{3}{4}$, $\frac{3}{4}$ (d) $1\frac{1}{2}$, $1\frac{3}{4}$, $1\frac{1}{4}$, $\frac{3}{4}$

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23. Look at the pie graph of a family's household expenditures. If the entertainment category represents 5% of the family's expenditures and is $\frac{1}{2}$ of three other expenses, which three expense categories are 10% each? _____

(a) gas, food and repairs
(b) food, repairs and donations
(c) repairs, entertainment and donations
(d) gas, donations and repairs



24. Which statement is supported by the information in the pie graph? _____

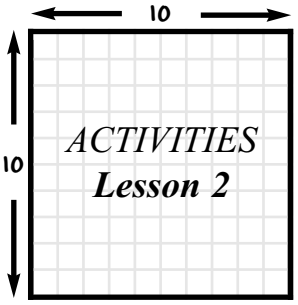
(a) Food and house categories make up one half of the family's expenditures.
(b) Food comprises one fourth of the family's expenses.
(c) Utilities expenditures exceed those of repairs and entertainment combined.
(d) The ratio of percentages of gas to utilities is the same as the ratio of donations to repairs.

25. Write the **Life Principle**: "_____
_____."

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Name: _____

Date: _____ Grade: _____





Signed Numbers

Signed Numbers

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Captain _____ discovered the continent of Antarctica in 1773.

2. The lowest temperature ever recorded on earth was recorded in _____.

3. A ***positive number*** is located _____ of zero on a number line.
(a) to the right (b) to the left (c) above (d) below

4. The three signs that denote a positive number are _____, _____, and no _____.

5. A ***negative number*** is located to the _____ of zero on a number line.

6. A negative number is denoted by the following signs: _____ or _____.

7. A person who studies weather is called a _____.

8. An instrument for measuring temperature is a _____.

9. Thermometers use the chemical, _____ to show temperature.

10. On a vertical scale such as a thermometer, numbers or temperatures below zero are denoted by _____ numbers.

11. _____ degrees is the hottest temperature the thermometer in Figure 2.1 could show.

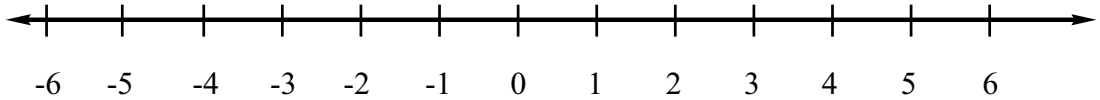
12. Zero is also called the _____ on the number line in Figure 2.2.

13. On a horizontal number line, a number is greater than another number, if the first number is _____ of the second on a number line.
(a) to the left (b) to the right (c) above (d) below

14. _____ is neither positive nor negative.

15. Number lines can continue _____ in _____ directions.

16. Using large dots, plot the following numbers on the number line below: -2, 4, 1, -3, -6.



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17. The negative sign looks like a(n) _____ symbol, but shows direction rather than operation.
(a) addition (b) subtraction (c) multiplication (d) division

18. On the y-axis, negative numbers are _____ the origin.
(a) left of (b) right of (c) above (d) below

19. ***Altitude*** is how _____ something is above sea level.

20. The "altitude" of an object under the ocean is denoted by a negative number and is known as _____.

21. If an airplane was flying at 29,500 ft, could it clear the mountain in Figure 2.4? _____
(a) Yes or (b) No

22. Figure 2.5 is a _____ system.

23. In the graph in Figure 2.5, the height of the mountain is plotted as a positive number above zero. _____ (a) True or (b) False

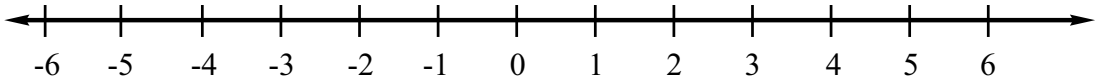
24. In the graph in Figure 2.5, the depth of the object under water is plotted as a positive number below zero. _____ (a) True or (b) False

25. When two numbers of like sign are added, the sign in the answer _____.
(a) changes or (b) remains the same

26. To add numbers of opposite sign, you must _____ the smaller from the larger and use the sign of the _____ for the answer.

27. Subtraction changes the sign of the ***subtrahend*** to the opposite sign. _____
(a) True or (b) False

Use the number line below to answer questions 28-38.



Determine which number is greater than (>) or less than (<) and place the correct symbol on the blank between the numbers.

28. 5 _____ 2 **29.** 0 _____ 4 **30.** -4 _____ 6 **31.** -5 _____ 5

32. 0 _____ -6 **33.** -2 _____ 2 **34.** -2 _____ -3 **35.** 4 _____ 5

36. -3 _____ 0 **37.** 1 _____ 6 **38.** -4 _____ -6

Perform the indicated operation.

39. $+4 + (-3) - 1 =$ _____

40. $+7 - {}^{+}4 + 3 =$ _____

41. $-5 + {}^{-}5 =$ _____

42. $6 - {}^{-}3 + {}^{-}4 + 10 =$ _____

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43. -9 + $^{-}$2 - 5 = _____

44. 5 - 4 + $^{-}$3 - $^{-}$2 = _____

45. -3 - 6 + $^{-}$2 + 9 = _____

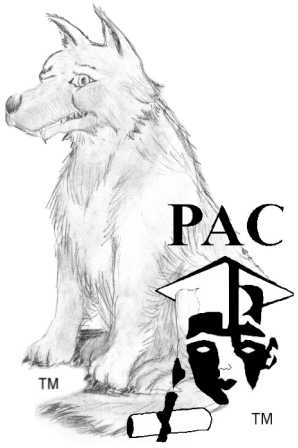
46. +9 - $^{+}$7 $^{+}$ -2 = _____

47. 8 - 4 - $^{-}$4 + 10 - $^{+}$5 = _____

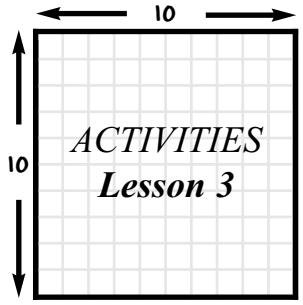
48. 22 + $^{-}$10 - $^{-}$4 - 16 = _____

49. Write the **Life Principle**: "_____
_____."

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Signed Numbers

Signed Numbers

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Operations containing negative numbers follow certain _____.

2. When multiplying or dividing two numbers of like sign the answer will always be: _____. (a) even (b) odd (c) positive (d) negative

3. When multiplying or dividing two numbers of opposite sign the answer will always be: _____. (a) even (b) odd (c) positive (d) negative

4. Fractions are another method of signifying a(n) _____ problem.
(a) addition (b) subtraction (c) multiplication (d) division

Determine the sign of the overall fraction in the following descriptions for #5-8.

5. If the numerator is positive and the denominator is positive; the sign of the overall fraction is _____.

6. If the numerator is negative and the denominator is positive; the sign of the overall fraction is _____.

7. If the numerator is positive and the denominator is negative; the sign of the overall fraction is _____.

8. If the numerator and the denominator are both negative; the sign of the overall fraction is _____.

9. What are the four ways that a negative one fifth can be written? _____, _____, _____, _____.

10. In multiplication and division problems, a(n) _____ number of negative signs makes the answer negative.

11. In division or multiplication problems or fractions, if all the signs are positive, the answer will be _____.

Determine the final sign of the following: (place a + or - in the blank beside the expression).

12. $3 \times (-6) - 2 \times 6$ _____

13. $5 \times (-5) \times (-4)$ _____

14. $2 \times (-3) \times (-34) \times (4)$ _____

15. $12 \div (-4) \times (+2)$ _____

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Find the solution to the following expressions. Be sure to watch your signs.

16. 45 × (-1) ÷ 5 = _____

17. 3 ÷ (-3) × (-4) = _____

18. 2 × 3 × (-5) × (-2) × (-2) = _____

19. 6 ÷ 2 ÷ (-3) × (-4) = _____

20. (-7) × (2) × (-2) = _____

21. 4 × 2 × (-1) = _____

22. (-3) × (-3) × (-2) = _____

23. (-6) × 2 × (-1) = _____

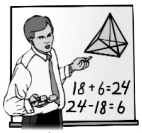
24. 2 × 2 × 3 × (-1) = _____

25. Write the **Life Principle**: "_____
_____."

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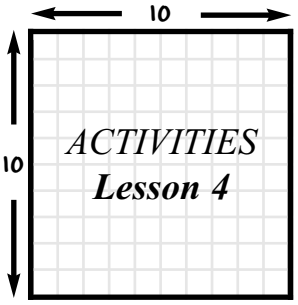
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Fundamentals

Grouping



You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. We are _____ by the company we keep.

2. A person can get a bad reputation by "_____" with the wrong type of people.

3. _____ people usually practice values and morals necessary to succeed in life.

4. Proper _____ and _____ are necessary to succeed in life.

5. _____ are important in a mathematical problem to determine which operation to perform first.

6. ***Grouping symbols*** group numbers in a _____.

7. The three most commonly used grouping symbols in mathematics are the _____, the _____, and ***braces*** or _____.

8. When adding, _____ numbers are grouped and added at a time.

9. When the _____ of performing certain operations is important to a problem, mathematicians use grouping symbols.

10. The most commonly used grouping symbol is the _____.

11. Operations within ***parentheses*** must be performed _____.

12. How many sets of grouping symbols are shown in the Example Set 1 a) problem? _____.

13. In Example Set 1 b), which operation is performed within both sets of parentheses? _____

14. Example Set 1 c) is the same expression as in b), except c) has no _____.

15. Which concept is best illustrated in Example Set 1 b) and c)? _____

(a) The equations have different answers.
(b) Both use addition and subtraction.
(c) Use of parentheses in *order of operations* produces a different answer than not using parentheses.
(d) The use of parentheses is handy when a smaller answer is needed.

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16. The _____ set of grouping symbols are completed first, when two or more sets of grouping symbols are contained within a problem.

17. How many sets of grouping symbols are in the problem in Example Set 2? _____

18. The _____ is the innermost set of grouping symbols in Example Set 2.
(a) { } (b) [ ] (c) ( ) (d) + =

19. In Example Set 2, after completing Step 1, the _____ become the innermost grouping symbol. (a) { } (b) [ ] (c) ( ) (d) + =

20. The sum found in the curly brackets of Step 3 is _____.

21. Review question. Number in order the *first*, *second* and *third* considerations when working math problems with grouping symbols:
_____ curly brackets
_____ parentheses
_____ square brackets

22. The symbols, ×, •, ( ), may be used to denote the mathematical operation of _____.
(a) division (b) addition (c) subtraction (d) multiplication

Refer to Example Set 3 to work the following problems. Show each step.

23. 4(6) = _____

24. [10(4)] ÷ (2 • 2) = _____

25. 3(2 × 1) × 2 = _____

26. 2 • 4 (9 ÷ 3) = _____

27. (4 • 25) ÷ 10 = _____

Refer to Example Set 4 to solve the following problems. Show each step.

28. 12 + {2(4 ÷ 2)} - 6 = _____

29. 5+ (3 • 3) - 2{2[2(3 + 1)]} = _____

30. 6(3) - [2(8 + 1) + 4] = _____

31. (9 • 10) - 4(4 • 5) = _____

32. 3{4 - 5[2(4 + 2) - 10]}+ 2 = _____

33. 6 - [3(8 - 5) + 4] = _____

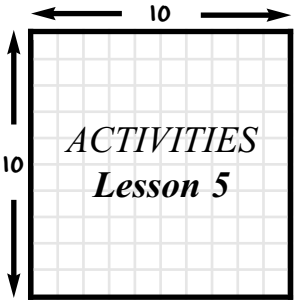
34. (4 • 5) - [60 ÷ (3 + 2)] = _____

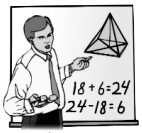
35. Write the **Life Principle**: "_____
_____."

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Name: _____

Date: _____ Grade: _____





Fundamentals

Associative and Distributive Properties

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Grouping symbols are important to the _____ and _____ properties of mathematics.

2. How numbers are grouped can change the _____ of a problem.

3. In much the same way, people with whom you associate or group can change the outcome of your _____.

4. The math statement of 4 + (5 + 1) is an example of the _____ Property.

5. Grouping symbols signify what numbers and operations are to be completed _____.

6. Which of the following is **NOT** an example of the Distributive Property. _____
(a) 2 • 5 + 4 - 6 (b) 4(2 + 5) - 4 • 2 + 4 • 5 (c) 7(5 - 4) = 7 • 5 - 7 • 4

7. Numbers outside a grouping symbol are _____ by multiplication "across" addition and subtraction symbols.

Use the Distributive Property to simplify the following expressions. Show all of your work.

8. 8(1 + 4) = _____

9. 4(8 + 5 - 3) = _____

10. 10(5 - 7) = _____

11. 6(2 - 5 + 4 - 2 + 8) = _____

12. Mathematicians use _____ to represent numbers for which they do not know a value.

13. An "_____" is a letter used to signify the position of the answer in a mathematical expression.

Look at the following problems and determine a value for the unknown to make the equation a true statement (14-20).

14. x - 1 = 5 x = _____

15. a + 3 = 6 a = _____

16. y + 90 = 100 y = _____

17. x - 25 = 25 x = _____

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18. $7 + b = 14$ $b =$ _____

19. $15 - c = 1$ $c =$ _____

20. $5 + y = 10$ $y =$ _____

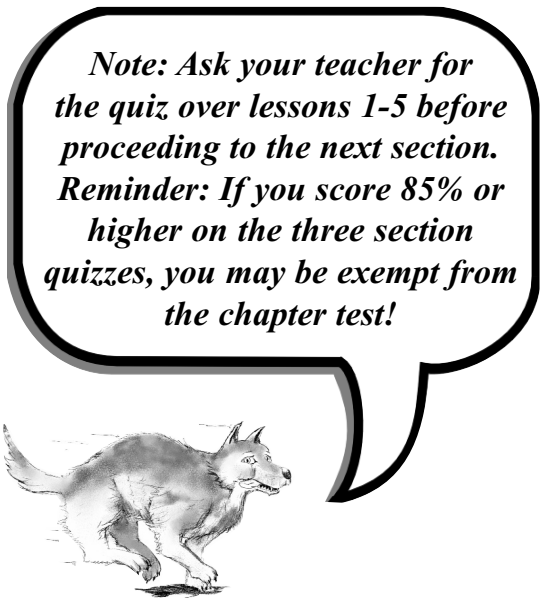
21. A letter used to represent any number in a mathematical definition, property, or formula is called a _____.

22. Write a mathematical statement of the Associative Property of addition in generalized form. _____

23. Write a mathematical statement of the Distributive Property of multiplication across addition in generalized form. _____

24. Write a mathematical statement of the Distributive Property of multiplication across subtraction in generalized form. _____

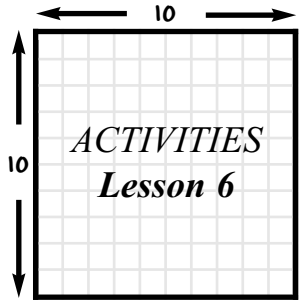
25. Write the **Life Principle**: "_____ _____."



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Name: _____

Date: _____ Grade: _____





Exponents

Exponentially Speaking

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The testimony of the witness in the District court was recorded by the _____.

2. To save time, a secretary or other person may use a form of _____.

3. ***Court reporters*** use a special _____ to record court proceedings.

4. Mathematicians have developed _____ methods for relating problems to other mathematicians.

5. A shortcut to addition is _____.

6. Write the shortcut for 5 + 5 + 5 + 5 + 5 as a mathematical statement: _____

7. The use of _____ is another "***shorthand***" method in mathematics.

8. A number that is raised to a power is called the _____.

9. The variable, *x*, raised to the fourth power, means to multiply *x* as a factor _____ times.

10. A number written with an exponent is said to be written in _____ form.

11. In the expression 5^3, 5 is the _____, and 3 is the _____.

12. In the expression 34^5, to what power is 34 raised? _____

13. Is 4 × 4 × 4 written in exponential form? _____ (a) Yes or (b) No

14. 2^3 = _____

15. 2^6 = _____

16. 3^5 = _____

17. $(-6)^2$ = _____

18. $(-4)^3$ = _____

19. 1^{100} = _____

20. 0^{25} = _____

21. As seen in Example Set 1, if a negative ***base*** is raised by an odd numbered power, the answer is always _____.

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22. If a negative base is raised by an even numbered power, the answer is always _____.

23. When a fraction is raised to an exponent, both _____ and _____ are raised to that exponent.

24. Which of the following is an example of the Property of Fractions with Exponents? ____

(a) $(\frac{4}{5})^2 = 2 \bullet \frac{4}{5}$ (b) $(\frac{5}{7})^3 = \frac{5 \bullet 5}{7}$ (c) $\frac{7}{5}$ (d) $(\frac{4}{5})^2 = \frac{4 \bullet 4}{5 \bullet 5}$

25. Any number raised to the power of zero is _____.

26. Which of the following illustrates the Property of the Exponent of Zero? _____
(a) $2^{10} = 200$ (b) $6^{100} = 6000$ (c) $45^0 = 1$ (d) $(1/10)^3 = .0001$

27. Any number raised to the power of one is the _____.

28. Which of the following represents the Property of the Exponent of One? _____
(a) $8^0 = 1$ (b) $234^1 = 1$ (c) $151^1 = 151$ (d) $1 \times 1 = 1$

29. Any number raised to a negative power changes the number to its _____ raised to the _____ power.

30. Which of the following represents the Property of Negative Exponents? _____
(a) $6^{-4} = (1/6)^4$ (b) $5^{-3} = (1/5)^{-3}$ (c) $3^2 = (9/1)^1$ (d) $(1/10)^{-3} = -.0001$

Use what you have learned about exponents to work the following problems.

31. 67^0 = _____

32. 67543^1 = _____

33. 4^{-3} = _____

34. 3^{-2} = _____

35. $6^2 - 5^2$ = _____

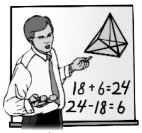
36. $(54321)^0 + 2^2$ = _____

37. Write the **Life Principle**: "_____ _____."

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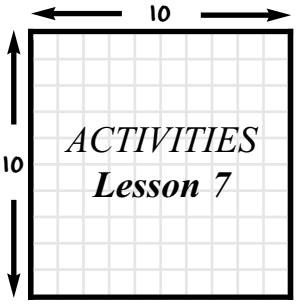
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Fundamentals

PEMDAS



You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The universe has design and _____.

2. The periodic chart of elements reflects _____, allowing predictability.

3. Societies have rules and regulations that promote _____.

4. Problems are solved much easier if the proper principles and _____ are followed.

5. In mathematics, the proper procedure for solving problems is called _____ of _____.

6. A part of a ***mathematical expression*** that often indicates a product is called a _____.

7. $7 \cdot x$, $5 \cdot 4$ and 8^2 are all examples of mathematical _____.
(a) terms (b) expressions (c) exponential terms (d) order of operations

8. A(n) _____ is a ***term*** containing an exponent.

9. 6^2 is an example of a(n) _____.
(a) term (b) mathematical expression (c) exponential term (d) order of operations

10. Which of the following is **NOT** an ***exponential term***? _____
(a) $5 \cdot 4 \cdot 3^2$ (b) 34^3 (c) $56 + 5 - 9$ (d) 0^{35}

11. Two or more terms separated by addition or subtraction symbols are called a _____.

12. Write the *order of operations* words for PEMDAS:
P: _____
E: _____
M: _____
D: _____
A: _____
S: _____

13. An easy way to recall the order of operations (PEMDAS) is to memorize the jingle:
"P_____ E_____ M_____ D_____ A_____ S_____"

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Refer to Example Set 1 to complete questions 14-17.

14. The first operation performed is multiplication because you must perform the operations within the _____ first.

15. After completing the operations within the parentheses, you must then move on to solve the _____.

16. 2^2 = ____ × _____.

17. $4 + (3 \bullet 2 - 4) - 2^2$ = _____

Refer to Example Set 2 to complete questions 18-23.

18. In Step 1 of the problem, write the term with the most grouping symbols. _____

19. This term contains _____ grouping symbols.

20. _____ must be followed within a grouping symbol.

21. All multiplication and division is done in order from _____ to _____.

22. Finally, all addition and subtraction is done in order from _____ to _____.

23. + (-30) = _____

24. Refer to the Grouping Principle to answer the following question. The number understood to be in front of $(7 \times 2 + 9)$ is the number _____.

Simplify the following mathematical expressions. Remember to follow PEMDAS. Show your work.

25. $2 \bullet 5 + [3(6 \div 3) - 4]$ = _____

26. $2^2 - 3 + (-3)^3$ = _____

27. $(-5)^{-2}$ = _____

28. $3(-2)^2 - 3(3)^0 + 5$ = _____

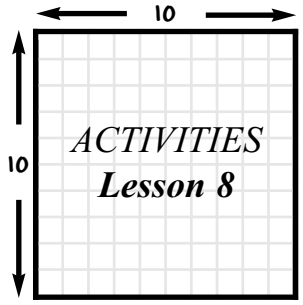
29. $2(4 - 3) + [6(9 - 5) - 2 \bullet 10]$ = _____

30. Write the **Life Principle:** "_____
_____."

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Date: _____ Grade: _____





Exponents

Square Power

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. To raise a number to a power means to _____ the number as a factor, the same number of times as the value of the exponent.

2. Part of the "American Dream" is to _____ your own _____.

3. Often a _____ helps in the planning of the house.

4. The _____ helps build the house or oversees the construction of it.

5. The husband desires to make his wife _____.

6. A(n) _____ draws plans for buildings.

7. ***Area*** equals _____ times _____ and is measured in _____.

8. The volume of a thing, in this case *concrete*, is measured in _____ units.

9. *Area* is based on which geometric figure? _____
(a) circle (b) square (c) rectangle (d) triangle

10. Figure 8.1 is a drawing of a _____ closet.

11. The area of the water heater closet is _____ sq ft.

12. To ***square*** a number means to _____ the number as a factor twice.

Refer to Example Set 1 to work problems 13 and 14.

13. A piece of paper is 30 inches on all four sides. The area of the paper is _____ sq in.
(a) 60 (b) 90 (c) 120 (d) 900

30 in
30 in | A = ?

14. A meeting room in a large building is a 45 ft square. The area of the room is _____sq ft.
(a) 90 (b) 180 (c) 2025 (d) 4050

45 in
45 in | A = ?

15. In questions 13 and 14, the figures described were _____.

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16. In a square, all four sides are _____.

17. The area of a square is found using the formula: _____ = _____.

18. Area is given in _____ units because it is a series of squares side by side.

19. The dimensions of the large object in Figure 8.2 are: length _____; width _____.

20. A _____ is a geometric figure with opposite sides equal.

21. The area of a ***rectangle*** is found using the formula: ___ = _____.

22. The area of the figure in problem 19 is _____sq units.

Refer to Example Set 2 to answer question 23-28.

23. The sidewalk is ____ ft wide.

24. The patio is _____ ft wide, and _____ ft long.

25. The outer dimensions of the sidewalk are: length _____ ft and width _____ft

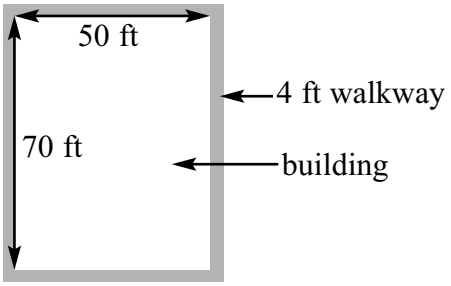
26. To find the area of a border, you must first find the area of two _____.

27. The area of the outer dimensions of the sidewalk (smaller rectangle) is subtracted from the area of the patio (larger rectangle). _____ (a) True or (b) False

28. The area covered by the sidewalk is _____ sq ft.

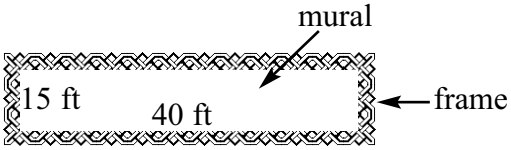
29. A building is 50 feet wide and 70 feet long, surrounded by a 4 foot stone walkway. The total area of the building and walkway is _____ sq feet.

30. In problem 29 (above), the area of the building alone is _____.



(a) 1,024 (b) 3,500 (c) 4,524 (d) 8,024

31. A huge, 15 feet by 40 feet mural in a swank hotel has a massive, gold-tone frame. The over-all area is 714 feet. What is the area of the frame? _____



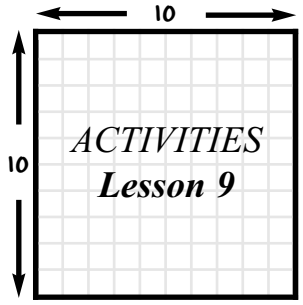
(a) 96 ft^2 (b) 114 ft^2 (c) 125 ft^2 (d) 132 ft^2

32. Write the **Life Principle**: "_____
_____."

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Name: _____

Date: _____ Grade: _____





Radicals

Square Roots

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Professor K puts his mathematical car in _____ to calculate square roots.

2. The total area is the _____ of a number.

3. By dropping the _____, Professor K determines the root of a number.

4. Finding the ***square root*** of a number is the _____ operation from squaring a number.

5. $\sqrt{\ }$ is called a _____ sign.

6. If the area is known, _____ is used to find the length of the side of a square.

7. The square root of 400 is _____.

8. A ***perfect square*** is always a _____ number.

Determine the following square roots. Show your work. (9-18)

9. $\sqrt{25}$ = _____ **10.** $\sqrt{100}$ = _____ **11.** $\sqrt{64}$ = _____ **12.** $\sqrt{81}$ = _____

13. $\sqrt{9}$ = _____ **14.** $\sqrt{49}$ = _____ **15.** $\sqrt{1}$ = _____ **16.** $\sqrt{4}$ = _____

17. $\sqrt{144}$ = _____ **18.** $\sqrt{121}$ = _____

Complete the following word problems (19-20). Show your work.

19. A welder needed a piece of metal in the shape of a square. He needed to cover 36 sq ft. How long will each side of the square be to obtain 36 sq ft of metal? _____

20. Professor K needed a 225 sq ft of room in his new office at home. The room would be _____ feet on all sides if Professor K insisted that the office be in the shape of a square.

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21. The principal square root is always a nonnegative or _____ whole number.

Determine the following square roots referring to Example Sets 2 and 3 as necessary. Show your work.

22. $\sqrt{54}$ = _____

23. $\sqrt{99}$ = _____

24. $\sqrt{88}$ = _____

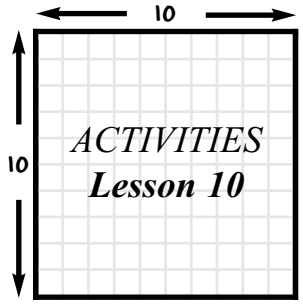
25. $\sqrt{648}$ = _____

26. Write the **Life Principle**: "_____
_____."

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Name: _____

Date: _____ Grade: _____





Exponents

Cubes

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. To find the ***cube of a number*** you must raise the number to the power of _____.

2. Squares are used in relationship to _____.

3. ***Cubes*** are used in relationship to _____.

4. The formula for finding the ***volume*** of a cube is _____.

Refer to Example Set 1 to solve problems 5-6.

5. A box is 3 ft on all of the edges. The volume of the box is _____ cubic ft.

6. A storage building having 8 ft square walls, floor and ceiling will hold _____ cubic ft of belongings.

7. In problems 5 and 6 (above) the objects are in the shape of a: _____.
(a) cube (b) square (c) rectangle (d) triangle

8. The more generalized formula for determining volume is ____ = _____.

9. *Volume* is determined in cubic units by filling a space with _____ of one unit length on each edge.

10. _____ the three dimensions of *height*, *length* and *width* together produces the *value* of the volume.

11. The volume of the object in Figure 10.2 is _____ cubic units.

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Refer to Example Set 2 to work questions 12-15.

12. Professor K wants to ship some _____.

13. The volume of the books Professor K wants to ship is _____ cubic feet.

14. The volume of the crate was _____.

15. All of Professor K's books can be shipped in this crate. _____ (a) Yes or (b) No

Express the cubes of the numbers in problems #16-22.

16. $(-4)^3$ = _____

17. $(5)^3$ = _____

18. $(3)^3$ = _____

19. $(-2)^3$ = _____

20. $(-1)^3$ = _____

21. $(6)^3$ = _____

22. $(0)^3$ = _____

23. Determine the volume of a shipping crate 7 feet on an edge. _____

24. A computer company ships its computer monitors in a box shaped like a cube. The edges of the box measure 3 ft. The monitor is 1.5 ft high, 2 ft deep, and 2 ft wide. What is the volume of "popcorn" packing needed to fill the space between the monitor and the box? _____ *(Hint: Determine the volume of the box, then determine the volume of the monitor. Subtract the volume of the monitor from the volume of the box.)*

25. Write the **Life Principle**: "_____
_____."

Note: Ask your teacher for the quiz over lessons 6-10 before proceeding to the next section. Reminder: If you score 85% or higher on the three section quizzes, you may be exempt from the chapter test!



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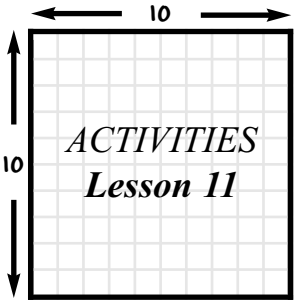
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Date: _____ Grade: _____



Radicals

Cube Roots



You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. To cube a number or to find its ***cube root***, you must raise the number to the power of _____.

2. Squares are used in relationship to _____.

3. ***Cubes*** are used in relationship to _____.

4. A radical with no ***index*** represents a _____, whereas a radical with a superscript of 3 written to the upper left indicates a _____.

5. The cube root of a negative number is _____.

6. A cube has _____ equal factors or roots.

7. Cube roots are used to find the length of the _____ of a cube.

Refer to Table 11.1 and Example Set 1 to solve problems 8-15.

8. The cube root of 8 is _____.

9. The cube root of -8 is _____.

10. The cube root of 216 is _____.

11. $\sqrt[3]{-125}$ = _____

12. $\sqrt[3]{-1}$ = _____

13. $\sqrt[3]{1}$ = _____

14. $\sqrt[3]{-216}$ = _____

15. $\sqrt[3]{64}$ = _____

Solve the following word problems (16-19). Show your work.

16. A storage crate used by the Red Cross to ship medical supplies wherever needed in time of disaster will hold a volume of 729 cubic feet. If the crate is in the shape of a cube, what is the length of each edge of the crate? _____

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17. Calculate the length of one edge of a cube with a volume of 1331 cubic inches.
_____

18. Calculate the dimensions (length, width, height) of a container in the shape of a cube with a volume of 512 cubic feet. _____

19. Professor K needs to build a large crate for his books. He needs a crate in the shape of a cube that will hold 343 cubic feet. Will Professor K be able to use eight-feet long boards to construct the frame? _____
(a) No, the boards are 2 feet too short.
(b) Yes, the boards are exactly the right length.
(c) No, the boards are too wide.
(d) Yes, the boards are actually a foot longer than needed.

Refer to Example Set 2 to help solve problems #20-24.

20. $\sqrt[3]{375}$ = _____

21. $\sqrt[3]{256}$ = _____

22. $\sqrt[3]{108}$ = _____

23. $\sqrt[3]{32}$ = _____

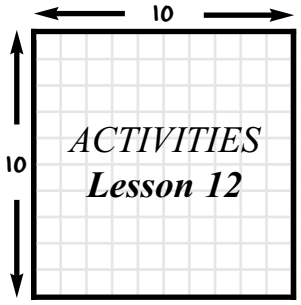
24. $\sqrt[3]{24}$ = _____

25. Write the **Life Principle:** "_____
_____."

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Converting

English Weight

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Other than length and volume, another important measurement used in the world involves _____.

2. Everyday you purchase and use products of various _____.

3. Units of _____ can be expressed in the _____ or the _____ System, just as length and volume.

4. ***Weight*** is with how much force an object is being pulled toward the center of the earth by _____.

5. From Table 12.1, the largest unit of weight in the English System is the _____.

6. From Table 12.1, the smallest unit of weight in the English System is the _____.

7. From Table 12.2, to convert pounds to hundredweight you _____.

8. From Table 12.2, to convert pounds to ounces you _____.

9. In Example Set 1, the only operation performed was _____, two times.

10. 4800 oz = _____ cwt

11. In Example Set 2, you must _____ to convert tons to ounces.

12. In Example Set 2, 2 tons = _____ oz.

13. In Example Set 3, Professor K shows how to convert _____ to _____.

14. 256 oz = _____ lbs

Work the following weight conversions in the English System. Use the space provided to set up your calculations. Write your answers in the blanks provided. (15-24)

15. 62 cwt = _____ oz

16. 90000 lbs = _____ tons

17. _____ lbs = 2 tons

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18. 1600 oz = _____ cwt

19. 400 cwt = _____ tons

20. 65 cwt = _____ oz

21. 1 ton = _____ lbs

22. 32 oz = _____ lbs

23. 6400 oz = _____ cwt

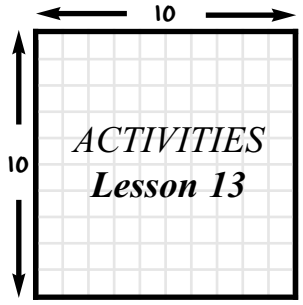
24. 1 ton = _____ oz

25. Write the **Life Principle**: "_____
_____."

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Name: _____

Date: _____ Grade: _____





Converting

Metric Weight

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Other countries use the _____ to show weight as well as length and volume.

2. _____ is determined by the amount of gravitational force is exerted on an object being pulled toward the center of the earth.

3. The basic unit of measurement for weight in the metric system is the _____.

4. To describe different weights in the metric system, different _____, or "word beginnings," are added to the unit for weight.

5. The prefixes have the same meaning for weight as for _____ and _____.

6. kilo- means _____.

7. deci- means _____.

8. milli- means _____.

9. To make conversions moving left to right in Table 13.2 you must _____.

10. To make conversions moving right to left you must _____.

11. Using the _____ of _____ makes conversions involving the metric weight unit easier.

12. In Example Set 1 a), 4 was _____ by 10, three times.

13. In Example Set 1 b), 3400 dkg = _____ kg.

14. In Example Set 2 a), 35 is _____ by 1000 once, or _____ three times to convert grams to milligrams.

15. To convert decigrams (dg) to dekagrams (dkg) requires _____.
(a) addition (b) subtraction (c) multiplication (d) division

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Work the following conversions in the Metric System. Remember to use the Directional Method of Converting. (16-24)

16. 16 dkg = _____ mg

17. 2100 dkg = _____ dg

18. 1000 g = _____ kg

19. 6000 cg = _____ g

20. 8 kg = _____ cg

21. 400 hg = _____ mg

22. _____ g = 6 dg

23. 2000 dg = _____ g

24. 350 dkg = _____ hg

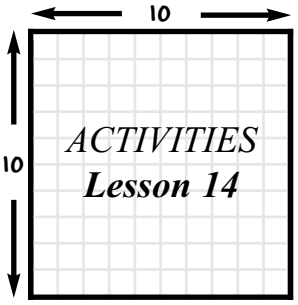
25. Write the **Life Principle**: "_____
_____."

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Fractions

Fractional Measure



You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Everyday you encounter problems that involve _____.

2. Many of these problems also include _____.

3. Most cooks use recipes that require _____ portions of certain ingredients.

4. When purchasing fresh food at the grocery store, the weight may be calculated in fractions of _____.

5. The _____ on a car measures not only miles, but also tenths of a mile.

6. In Example Set 1, Professor K's wife was baking a _____.

7. Something constructed for a particular purpose is a _____.

8. In Example Set 1, the units are set up so that they _____ out.

9. 1 T = _____ tsp

Refer to Example Set 2 to answer questions 10-14.

10. A roll of barbed wire contains _____ mile of wire.

11. To _____ means to join together at the ends.

12. 1760 yds = _____ mile

13. _____ yds = one-fourth of a mile

14. Farmer Brown had to purchase _____ rolls of wire to build his fence.

Refer to Example Set 3 to answer questions 15-20.

15. A period of time in history of the United States, beginning in 1849 with the discovery of gold in California, is called the _____.

16. Gold was selling for _____ per ounce.

17. The unit divided out was _____.

18. The gold nugget weighed _____ oz.

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19. The gold nugget was worth _____.

20. Units, like numbers, can be _____ (canceled) to become 1.

Refer to Example Set 4 to answer questions 21-24.

21. The most common use of decimals in the English system of measurement is in the calculation of how many miles a vehicle has traveled on a _____ of gasoline.

22. Professor K traveled a total of _____ miles.

23. A _____ must be set up to show the relationship between miles traveled and gallons of gasoline used.

24. 366 miles ÷ 20 gallons of gasoline = _____ miles per gallon.

Work the following fractional English conversion problems. Use the space provided to show your work. (25-26) (You may use the Mathematics Chart at the end of this booklet if necessary.)

25. $\frac{1}{2}$ gal = _____ pints

26. $\frac{1}{8}$ mile = _____ feet

Solve the word problems (27-28). (Show your work.) (You may use the Mathematics Chart at the end of this booklet if necessary.)

27. Professor K took a trip to Washington DC. The trip was 2200 miles in length. Professor K purchased 150 gallons of gasoline during the trip. How many miles per gallon (mpg) did Professor K's car average during the trip? _____

28. Many pickup trucks are rated as $\frac{3}{4}$ ton trucks. These trucks can legally haul _____ ounces.

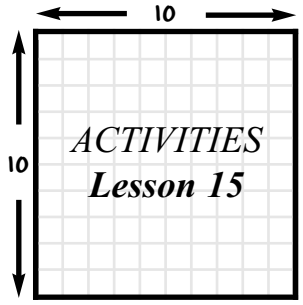
29. $\frac{3}{4}$ gal = _____ cups

30. Write the **Life Principle**: "_____
_____."

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Name: _____

Date: _____ Grade: _____





Percent

Of Some Interest

You are making progress! ***Answer the following questions. Choose the correct answers or fill in the blanks with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Roberto needed a new _____.
(a) van (b) vehicle (c) wheel (d) truck

2. The rate of ***interest*** the ***car dealership*** offered Roberto was _____.

3. Roberto thought that his _____ would give him a better ***loan***, so he met with his _____.

4. A _____ is an individual who make loans at a bank.

5. Businesses need to make a _____ (in order to stay in business).

6. A _____ is the money remaining after all expenses have been paid.

7. The interest rate at the bank was _____.

8. The bank allowed Roberto to take a longer amount of _____ to pay back the loan.

9. The _____ of a loan is the amount of time given to pay the loan back.

10. If a loan has a longer term, the payments are usually _____.

11. If a loan has a longer term, the total amount of money repaid may be _____ than for a loan with a shorter term on the same amount of money.

12. The principal of a loan is the: _____.
(a) term (b) pay back (d) interest (d) actual amount borrowed

13. The formula for computing ***simple interest*** is _____.

Refer to Example Set 1 to answer questions 14-18.

14. The bank allowed Roberto _____ years to repay the loan.

15. The car dealership allowed Roberto _____ years to repay the loan.

16. The interest rate from the bank was _____.

17. The car dealership's interest rate was _____.

18. The *difference* between the two amounts of interest was _____.

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Refer to Example Set 2 to answer questions 19-22.

19. The formula for calculating the total amount of money to be repaid is _____.

20. The original principal amount of the loan was _____.

21. The total amount to be repaid to the car dealership was _____.

22. Roberto needed to estimate his _____ payment for each loan.

Refer to Example Set 3 to answer questions 23-26.

23. To calculate the monthly payment you must _____the total amount to be repaid ($A = P + I$) by the total number of months in the term of the loan.

24. The formula for calculating the monthly payment is _____.

25. To make a wise choice, Roberto will have to take out a loan at the _____ so that he will not spend more than he has available.

26. Predict what would happen if Roberto was not able to make his car payments: _____

_____

(a) The car would be abandoned.
(b) The car would be stolen.
(c) The car would be repossessed by the loan agency.
(d) The car would be "totaled" by the insurance company.

Refer to the examples to work problems 27-31. Calculate the simple interest from the information provided. Show your work and write the answers on the blank.

27. P = \$8,000.00, r = 10%, t = 5 years _____

28. P = \$5,000.00, r = 5%, t = 1 year _____

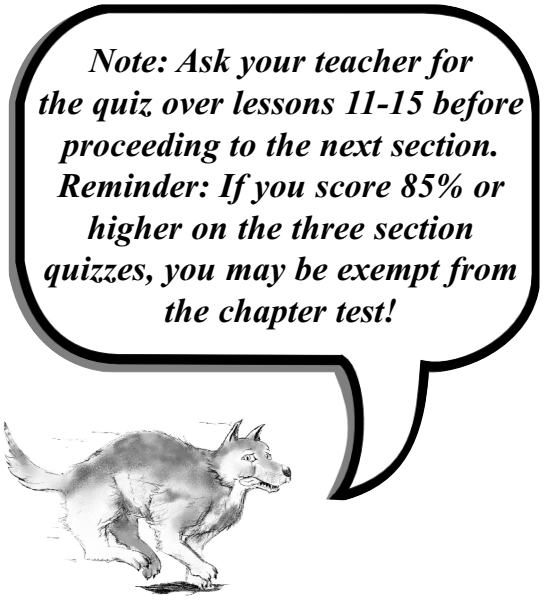
29. P = \$100,000.00, r = 1%, t = 2 years _____

30. A local bank advertised new car loans for 3 years at 4% interest. Calculate the simple interest on a loan of \$15,000.00. _____

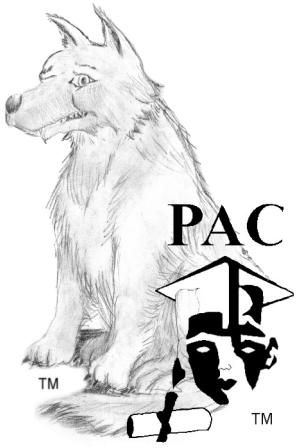
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31. Professor K loaned a friend some money. The friend insisted on paying Professor K some interest on the loan. Professor K only charged 1% on a loan of $500.00 for one year to his friend. Calculate the total amount Professor K's friend paid Professor K at the end of one year. _____

32. Write the **Life Principle**: "_____ _____."



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Basic Math Skills

Mathematics Charts

LENGTH - ENGLISH SYSTEM

12 inches	=	1 foot
3 feet	=	1 yard
5.5 yards	=	1 rod
320 rods	=	1 mile
1,760 yards	=	1 mile
5,280 feet	=	1 mile

VOLUME - ENGLISH SYSTEM

1 tablespoon, Tbsp, T	=	3 teaspoons, tsp
1 cup, c	=	16 tablespoons, Tbsp, T
1 pint, pt	=	2 cups, c
1 quart, qt	=	2 pints, pts
1 gallon, gal	=	4 quarts, qts

WEIGHT - ENGLISH SYSTEM

1 pound, lb	=	16 ounces, oz
1 hundredweight, cwt	=	100 pounds, lbs
1 ton	=	20 hundredweight, cwt
1 ton	=	2000 pounds, lbs

LENGTH - METRIC SYSTEM

1 meter	=	1,000 millimeters
1 meter	=	100 centimeters
1 kilometer	=	1,000 meters
1 centimeter	=	10 millimeters

VOLUME - METRIC SYSTEM

1 liter	=	1,000 milliliters
1 liter	=	100 centiliters
1 kiloliter	=	1,000 liters
1 centiliter	=	10 milliliters

WEIGHT - METRIC SYSTEM

1 gram	=	1,000 milligrams
1 gram	=	100 centigrams
1 kilogram	=	1,000 grams
1 centigram	=	10 milligrams

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Mathematics Charts

PERFECT SQUARES

$\sqrt{1}=1$	$\sqrt{25}=5$	$\sqrt{81}=9$	$\sqrt{169}=13$
$\sqrt{4}=2$	$\sqrt{36}=6$	$\sqrt{100}=10$	$\sqrt{196}=14$
$\sqrt{9}=3$	$\sqrt{49}=7$	$\sqrt{121}=11$	$\sqrt{225}=15$
$\sqrt{16}=4$	$\sqrt{64}=8$	$\sqrt{144}=12$	$\sqrt{256}=16$

PERFECT CUBES

$\sqrt[3]{1}=1$	$\sqrt[3]{-8}=-2$	$\sqrt[3]{64}=4$	$\sqrt[3]{-125}=-5$
$\sqrt[3]{-1}=-1$	$\sqrt[3]{27}=3$	$\sqrt[3]{-64}=-4$	$\sqrt[3]{216}=6$
$\sqrt[3]{8}=2$	$\sqrt[3]{-27}=-3$	$\sqrt[3]{125}=5$	$\sqrt[3]{-216}=-6$

$$P = \frac{\text{the number of elements in the set containing favorable outcomes}}{\text{the number of elements in the sample set}}$$

$$\textit{Midpoint} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

FORMULAS

Surface Area	Area	Volume	Perimeter/ Circumference	Others
Sphere: $A_s = 4\pi r^2$	**Triangle:** $A = {}^1\!/_2 bh$	**Sphere:** $V = {}^4\!/_3 \pi r^3$	**Perimeter of a Rectangle:** $P = 2w + 2l$	**Pythagorean Theorem:** $c^2 = a^2 + b^2$
Cylinder: $A_s = 2\pi rh + 2\pi r^2$	**Rectangle:** $A = l \times w$	**Cone:** $V = {}^1\!/_3 \pi r^2 h$	**Circumference of a Circle:** $C = 2\pi r$ or $C = \pi d$	**Convert to Fahrenheit:** $F = {}^9\!/_5 C + 32$
Cube: $A_s = 6s^2$	**Circle:** $A = \pi r^2$	**Rectangular Prism:** $V = l \times w \times h$		**Convert to Celsius:** $C = {}^5\!/_9 (F - 32)$
Lateral Surface Area of a Cone: $A_{ls} = \pi rl$	**Trapezoid:** $A = {}^1\!/_2 (b_1 + b_2)h$	**Square Pyramid:** $V = ({}^1\!/_3) lwh$		**Distance:** $d = r \bullet t$
		Triangular Prism: $V = {}^1\!/_2 bhl$		**Slope:** $y = mx = b$
		Cylinder: $V = \pi r^2 h$		**Simple Interest:** $I = prt$

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TIME CONVERSIONS

1 week = 7 days
1 year = 12 months

CONVERSIONS

English to Metric	
1 ounce (oz)	28.35 grams (g)
1 pound (lb)	454 grams (g)
1 ton (T)	907.2 kilograms (kg)

Metric to English	
1 gram (g)	.035 ounce (oz)
1 kilogram (kg)	2.2 pounds (lb)
1 metric ton (mt)	2200 pounds (lb)

English to Metric	
1 cubic inch	16.39 cubic cm
1 gallon	3.785 liters
1 cubic foot	28.316 liters
1 quart	.946 liters

Metric to English	
1 cubic cm	.061 cubic inch
1 cubic meter	35.315 cubic feet
1 liter	1.05 quarts
1 liter	.264 gallon

English to Metric	
1 inch	2.54 cm
1 foot	0.3048 meter
1 yard	0.9144 meter
1 mile	1.6 km

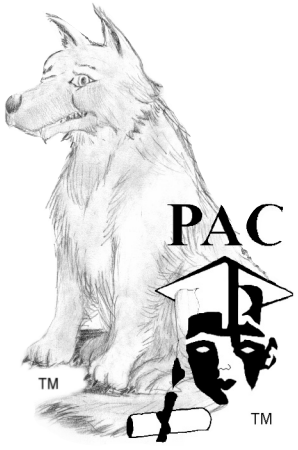
Metric to English	
1 centimeter	0.3937 in.
1 meter	39.37 in.
1 meter	1.09 yds
1 kilometer	0.6213 mile

AREA CONVERSIONS

1 square centimeter = 0.155000 sq in.
1 square meter = 10.763910 sq ft
1 square inch = 645.16 sq mm
1 square foot = 0.09290304 sq meter
1 square yard = 0.836127 sq meter
1 square foot = 144 sq in.

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