MATHEMATICS

In Grade 6, your child will focus primarily on four critical areas. The first is connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems. Your child will also focus on understanding division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers. Additionally, he will write, interpret, and use expressions and equations. The fourth focus area is developing an understanding of statistical thinking. Activities in these areas include:

- Writing a ratio that describes a relationship between two quantities.
- Comparing data from bar diagrams and frequency tables using ratios.
- Plotting values on the coordinate plane and determining the steeper line represents the greater ratio.
- Using a ratio as a conversion factor when working with measurements of different units.
- Plotting, labeling, and identifying whole numbers, fractions, and decimals on a number line.
- Adding, subtracting, multiplying, and dividing with whole numbers, fractions, and decimals.
- Performing operations with mixed numbers.
- Solving an equation or inequality to find the value of the variable.
- Analyzing tables and graphs to determine the dependent and independent variable and their relationship.
- Calculating measures of center (mean, median, and mode) and variability of a set of numerical data.
- Organizing and displaying data as a box plot, line plot, dot plot, or histogram.
- Drawing inferences about the shape of the distribution using measures of center and/or variability.

Your child can understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

- Write a ratio that describes a relationship between two quantities.
- Use ratio reasoning to solve real-world and mathematical problems.
- Compare data from bar diagrams and frequency tables using ratios.
- Use ratios to describe a simple set of data in different ways.
- Use of a four-function calculator for computations is not allowed on testing.

HELP AT HOME

- As your child shoots a ball into a garbage can or goal, have him record the outcomes on a frequency table. Determine the number of hits to misses, misses to hits, misses to shots, hits to shots. Repeat this activity with different objects and targets.

# OF SHOTS	HITS	MISSES
6	𝍸	||
10	𝍸 ||	|||
13	𝍸 |||	𝍸
17	𝍸 𝍸 |||	|||

HELPFUL HINT

A fraction is one way to write a ratio.

Your child can understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship.

- Convert a given ratio to a unit rate.
- Use ratio and rate reasoning to solve real-world problems.
- Compare unit rates.
- Find and justify the best buy using unit price.
- Use of a four-function calculator for computations is not allowed on testing.

HELP AT HOME

- When shopping, have your child determine the unit of rate of an item. (e.g., If a 6 pack of drinks is $2.50, how much is each one?)
- Determine which is the best buy at the local store: a 6 pack of drinks or a 12 pack of drinks?

VOCABULARY

≠ means not equal.

Your child can use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).

- Use ratio and rate reasoning to solve real-world and mathematical problems.
- Use a variety of tools: tape, diagrams, double number lines, or equations to demonstrate equivalent ratio.
- Use a four-function calculator for computing.

HELP AT HOME

- Display equivalent ratios in various ways by using sticky notes with the original ratio written on one and the equivalent written on another. For example, determine an equal ratio for 3/8, determine an equal ratio for 2/5, and determine an equal ratio for a problem such as: Allie ate 2 out of 5 cookies. Place the sticky notes in order from least to greatest on a double number line.

Your child can use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams or equations). Your child can make tables of equivalent ratios relating quantities with whole-number measurements, finding missing values in the tables, and plotting the pairs of values on the coordinate plane. Your child can also use a table to compare ratios.

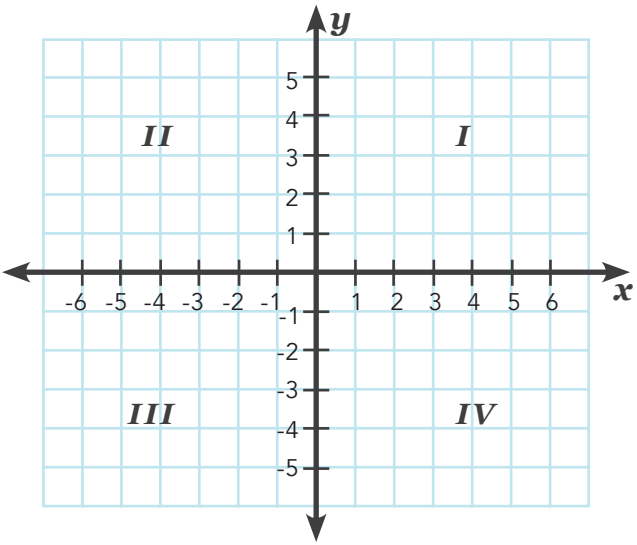
- Make a table of equivalent ratios.
- Use tables to compare ratios.
- Find missing values in tables.
- Plot values on the coordinate plane.
- Determine the steeper line represents the greater ratio.
- Use ratio and rate reasoning to solve real-world problems such as increasing a recipe to serve more people.
- Use a four-function calculator for computing.

HELP AT HOME

- While you cook, have your child make a table to show how much of one ingredient is needed to make a complete recipe. Fill in the table with up to five batches of the recipe.
- Graph the results of the amount of batches (x axis) to the amount of the ingredient (y axis).
- Repeat the activity with another ingredient.
- Compare and contrast the two graphs.

RESOURCES

COORDINATE PLANE GRAPH



NOTES

x = x axis

y = y axis.

Roman numerals ***I, II, III*** and **IV** indicate the quadrants.

The origin is the center (where the x axis and y axis meet in this diagram).

Your child can use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations). Your child can solve unit rate problems including those involving unit pricing and constant speed.

- Calculate speed, if distance and time are known.
- Calculate unit price, if total and cost quantity are known.
- Find and justify the "best buy."
- Use ratio and rate reasoning to solve real-world and mathematical problems.
- Use a four-function calculator for computing.

VOCABULARY

PERCENT OF A QUANTITY
60% of 50 = 30 ("of" means to multiply)

HELP AT HOME

- Determine the "best buy" of an object when shopping by writing and simplifying the ratio of cost to number of units of an item. Then repeat with a second item. Determine which one is the best buy.
- Use a toy car to determine speed. Measure a distance, record the time that it took the toy to travel the distance. This is a ratio of distance to time, which will simplify to give you the speed.

Your child can use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations). Your child can use ratio reasoning to convert measurement units, manipulate and transform units appropriately when multiplying and dividing quantities.

- Use a ratio as a conversion factor when working with measurements of different units.
- Use ratio and rate reasoning to solve real-world and mathematical problems.
- Use a four-function calculator for computing.

HELP AT HOME

- Help your child measure the length of a wall in your house in feet. Then convert the units to inches by using the conversion ratio of 12 inches to 1 foot. Repeat this activity with various forms of measurements.

VOCABULARY

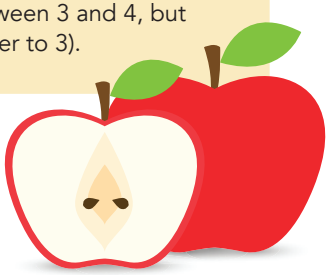
A **CONVERSION FACTOR** is a ratio that connects the two units (e.g., (12 inches)/(1 foot)).

Your child can interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions (e.g., by using visual fraction models and equations to represent the problem).

- Plot, label, and identify fractions on a number line.
- Evaluate the reasonableness of a solution based on the benchmark fractions 0, ½, and 1.
- Perform + (addition), - (subtraction), and · (multiplication) with fractions, and with whole numbers and fractions (with like and unlike denominators).
- Make comparisons between fractions given in multiple representations.
- Perform operations with mixed numbers.
- Use a variety of visual fraction models (e.g., tape diagram, number line diagram, area model).
- Cannot use a calculator, but must know the standard algorithm to convert between fractions and decimals.

HELP AT HOME

- Divide an apple in half. Cut each half into two parts. This demonstrates ½ ÷ 2 is 1/4 the size of the original apple.
- Have your child locate given mixed numbers on a rule (e.g., 3 1/4 is between 3 and 4, but closer to 3).



Your child can fluently divide multi-digit numbers using the standard algorithm.

- Divide multi-digit numbers using the standard algorithm.
- Check quotients for reasonableness.

VOCABULARY

STANDARD ALGORITHM is the basic way to solve any problem; probably the way you learned in school when you were a child.

HELP AT HOME

- Pour cereal on the table. Have your child determine how many pieces total there are on the table. Then have him put 32 in each group. The number of groups demonstrates what the total divided by 32 will be; the leftover cereal represents the remainder. Use this opportunity to show your child that when you add the groups together (or multiply the number of groups by 32) and add the remainder, the result will be the start amount.
- Repeat the same problem, but write it on paper using the standard algorithm.

Your child can fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

- Add and subtract multi-digit decimals using the standard algorithm.
- Multiply and divide multi-digit decimals using the standard algorithm.
- Use estimation to check answers for reasonableness.

HELPFUL HINT

There are 12 dimes in $1.20; therefore 1.20 divided by .10 is 12. Check this by multiplying 12 and .10 to see if the result is $1.20.

HELP AT HOME

- Using baseball cards, have your child determine the sum or difference of various baseball players' batting averages.
- Have your child determine how many dimes ($.10) and quarters ($.25) are in a given amount of money by dividing the monetary amount by the coin amount. Check division by multiplying and adding the remainder.

Your child can find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Your child can use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor.

- Find the greatest common factor of two whole numbers less than or equal to 100.
- Find the least common multiple of two whole numbers less than or equal to 12.
- Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum or two whole numbers with no common factor.

RESOURCES

The **LEAST COMMON MULTIPLE (LCM)** is the smallest multiplication answer a given group of numbers have in common.

MULTIPLES OF 3
3 6 9 12 (15) 18 21...

MULTIPLES OF 5
5 10 (15) 20 25 30 35...

LCM= 15

The **GREATEST COMMON FACTOR (GCF)** of two numbers is the highest number that divides exactly into two or more numbers.

FACTORS OF 12
1 2 3 (4) 6 12

FACTORS OF 16
1 2 (4) 8 16

GCF = 4

HELP AT HOME

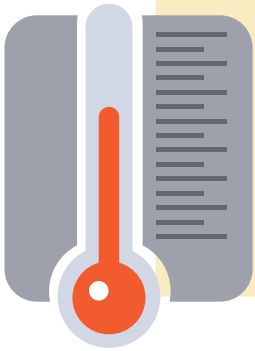
- With your child, determine what the greatest common factor of rolling four number cubes (dice) would be if each person rolled two number cubes. Each person writes down the number made by their two number cubes (e.g., rolling a "6" with one number cube and a "4" with the second number cube would give you the number "64"). Then work together to determine what the greatest common factor between the two resulting numbers would be.
- Repeat the same activity, with each person only having one number cube. Have your child determine the least common multiple of the two resulting numbers.
- Play a memory game with your child, matching pairs of expressions that have been factored by their greatest common factor to the expression that would result (e.g., 60 + 30 matches with 30(2+1)).

Your child can understand that positive and negative numbers are used together to describe quantities having opposite directions or values. Your child can use positive and negative numbers to represent quantities in the real-world contexts, explaining the meaning of 0 in each situation.

- Explain the relationship between positive and negative numbers in real-world context.
- Explain the meaning of zero in any real-world context.

HELP AT HOME

- Help your child make a list of positive situations in real life compared to negative situations, such as: deposit (positive) versus withdraw (negative), rise in temperature (positive) to drop in temperature (negative), positive charge to negative charge on a battery.
- Have your child determine what the zero means in each situation (e.g., zero means there was no change in temperature at all).

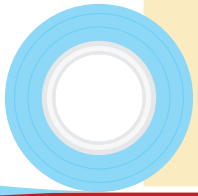


Your child can understand a rational number as a point on the number line. Your child can extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

- Plot a rational number as a point on the number line.
- Extend number lines as needed to display data.
- Extend coordinate axes learned in previous grades.
- Plot ordered pairs that may include negative coordinates.

HELP AT HOME

- Use tape to make two axes (a set of perpendicular lines) on the floor or wall. The horizontal line is the x axis. The vertical line is the y axis. Mark the intersection as "0." Have your child write the numbers to the left of zero (negative) and right of zero (positive), and above the zero (positive) and below the zero (negative).
- Use tape to place stickers at given (x,y) coordinates that include positive and negative values. Let your child come up with his own coordinates and place them on the graph.



RESOURCES

COORDINATE PLANE GRAPH

For an example of a coordinate plane graph, see page 17.

VOCABULARY

RATIONAL NUMBER: any number that can be written as a fraction.

HORIZONTAL: across (left and right).

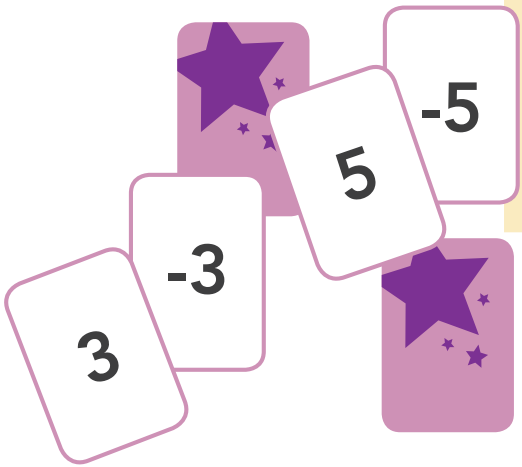
VERTICAL: up and down.

Your child can understand a rational number as a point on the number line. Your child can extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Your child can also recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; and recognize that the opposite of the opposite of a number is the number itself.

- Recognize opposite signs of numbers as indicating locations on opposite sides of zero on the number line.
- Find the opposite of any number.
- Read numbers accurately plotted on the number line.
- Plot numbers accurately on the number line.

OPPOSITE NUMBERS

Examples of opposite numbers are 5 and -5, -7 and 7.



HELP AT HOME

- Make a set of cards with numbers and their opposites (25 pairs). Shuffle the cards. Play the game with your child to see who can get the most matches of numbers and their opposites. Each person begins with 7 cards and asks the other if he has the opposite to a given number. If not, that person draws from the pile of extra cards. The game continues until all pairs are matched up. The person with the most matches at the end wins.
- Using the same cards, have your child place them in the correct location on a number line.

Your child can understand a rational number as a point on the number line. Your child can extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Your child can also understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; and recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axis.

- Use the signs of the coordinates to determine the location of an ordered pair in the coordinate plane.
- Plot a point on a coordinate plane.
- Read a point plotted on the coordinate plane.

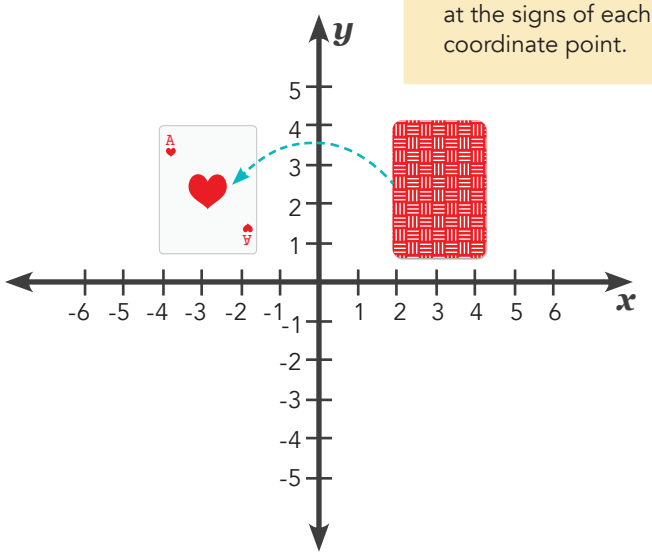
VOCABULARY

QUADRANT is the general location on a coordinate plane.

COORDINATE is the exact location on a coordinate plane.

HELP AT HOME

- Place a face card from a deck of cards face down at a given location on a coordinate plane (3,2). Have your child reflect (flip) it over the y axis, resulting with face up at the new location on the opposite side of the coordinate plane (-3,2). Repeat this with other examples.
- Help your child determine which quadrant a coordinate will be located in just by looking at the signs of each coordinate point.



Your child can understand a rational number as a point on the number line. Your child can extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. Your child can also find and position integers and other rational numbers on a horizontal or vertical number line diagram; and find and position pairs of integers and other rational numbers on a coordinate plane.

- Find and position integers and rational numbers on a horizontal or vertical number line.
- Find and position pairs of integers and other rational numbers on a coordinate plane.

HELP AT HOME

- Use string and make a clothesline number line, using index cards pinned to the line. On the index cards, make a set of rational numbers as positive or negative fractions, decimals, or whole numbers cards. Have your child place them on the line from least to greatest.

Your child can understand ordering and absolute value of rational numbers.

- Order rational numbers least to greatest or greatest to least.
- Find the absolute value of a rational number.

VOCABULARY

ABSOLUTE VALUE is written with a number inside parallel vertical lines (e.g., | 5 | or | 72 |).

HELP AT HOME

- Two people begin at the same location. Both take 2 equal steps but in opposite directions. Have your child determine who traveled the greatest distance. This shows absolute value because they are both the same distance from 0; distance is always positive no matter what direction you travel.

Your child can understand ordering and absolute value of rational numbers. Your child can interpret statements of inequality as statements about the relative position of two numbers on a line diagram.

- Describe the relative position of two numbers on a number line when given an inequality.
- Interpret statements of inequality as statements about relative position of two numbers on a number line diagram.

VOCABULARY

An **INEQUALITY** is an equation that uses the symbol of greater than (>) or less than (<).

HELP AT HOME

- Play "What number am I?" Have your child choose a number. Ask your child questions to determine what his number is. The questions should be relative position questions (e.g., are you three units to the left of 5?).
- Play the same game, but this time use inequality terms (e.g., are you greater than -3?).

Your child can understand ordering and absolute value or rational numbers. Your child can write, interpret and explain statements of order for rational numbers in real-world contexts.

- Write and interpret statements of inequality in terms of a real-world situation.
- Explain what the numbers in an inequality represent.

HELP AT HOME

- Give your child two numbers. Have him compare the numbers using an inequality. Then have him turn it into a real-world situation (e.g., 8 and -10 could be solved as 8 > -10; therefore it is better to have $8 than to lose $10).

Your child can understand ordering and absolute value of rational numbers. Your child can distinguish comparisons of absolute value from statements about order.

- Distinguish comparisons of absolute value from statements about order.

HELP AT HOME

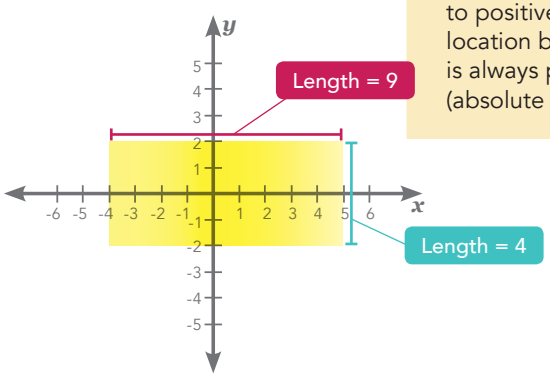
- Write a situation on a card face down. When flipped over, your child will tell you the answer in the form of a question, then explain the answer to the question (e.g., One card says, "A deposit of $15." Your child would respond, "How much is positive 15? It is an increase of $15 in a checking account."). Continue with various examples.

Your child can solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Your child can include use of coordinates and absolute value to find distance between points with the same first coordinate or the same second coordinate.

- Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane.
- Use coordinate and absolute value to find distance between points.

HELP AT HOME

- Make a rectangle using all four quadrants on a coordinate plane. Then have your child determine how long each segment is with no regard to positive and negative location because length is always positive (absolute value).



Your child can write and evaluate numerical expressions involving whole-number exponents.

- Write an expression using exponents to illustrate repeated multiplication.
- Multiply fluently whole numbers and fractions.
- Evaluate expressions that consist of whole-numbers, exponents, fractions, and decimals.
- Use a four-function calculator to evaluate expressions.

HELP AT HOME

- Have your child practice using a calculator to solve numbers with exponents.
- Review multiplying with double digit numbers with your child. Have him check his answers on a calculator.
- Review multiplying fractions with your child.
- Mix the numbers, fractions, and exponents, to evaluate equations (e.g., Let "a" = 2/5 in the problem $5^3 \times a + 4$. The solution would be $5^3 \times 2/5 + 4 = 54$.).

Your child can write, read, and evaluate expressions in which letters stand for numbers.

- Read accurately an algebraic expression containing variables and exponents (reading).
- Translate an expression from words to symbols (writing).
- Substitute in a value for the given variable and complete the calculations (evaluating).
- Add, subtract, multiply, and divide fluently with whole numbers, fractions, and decimals.
- Apply order of operations.
- Use a four-function calculator for computations.

HELP AT HOME

- Read an expression to your child that he cannot see, and have your child write the expression on the dry erase board. Then repeat the activity with you writing a different expression on the dry erase board and your child reading it out loud.
- Assign a number to a variable. Solve problems with the given variable using the order of operations (e.g., 3(n + 7) when n= 4).

VOCABULARY

A **VARIABLE** is a letter used in math that can represent any number.

Your child can write expressions that record operations with numbers and with letters standing for numbers.

- Write an expression when using whole numbers, fractions, and decimals.

VOCABULARY

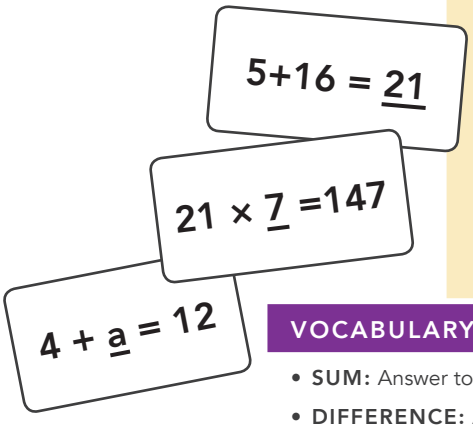
OPERATIONS include adding, subtracting, multiplying, and dividing.

HELP AT HOME

- Make a set of flashcards for your child with the expression on one side and the solution on the other (e.g., the total of x and 3 (x+3); the product of 5 and y (5y); 8 less than m (m-8)).

Your child can identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient). Your child can view one or more parts of an expression as a single entity.

- Identify accurately the parts of an expression.



HELP AT HOME

- Make more flashcards to put in the mix with the previous activity. Underline the part of the expression that is the question. Then ask your child to identify the underlined part of the expression. (e.g., n +7 (variable); 5y – 8 (coefficient)).

VOCABULARY

- **SUM:** Answer to addition problem.
- **DIFFERENCE:** Answer to subtraction problem.
- **PRODUCT:** Answer to multiplication problem.
- **QUOTIENT:** Answer to division problem.
- **FACTOR:** A number in a multiplication problem.
- **COEFFICIENT:** Number in front of a variable.
- **VARIABLE:** A letter.
- **CONSTANT:** Number without a letter attached.

Your child can evaluate expressions as specific values of their variables. Your child can include expressions that arise from formulas used in real-world problems. Your child can also perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order.

- Evaluate an expression for a given value.
- Substitute values in formulas to solve real-world problems.
- Apply order of operations with or without parentheses.
- Evaluate expressions that arise from formulas; however, he is not required to manipulate the formulas.

HELP AT HOME

- Have your child determine the area of a rectangular piece of paper. Then have him determine the area of a different sized rectangular piece of paper. Stress to your child that you used the same formula to determine the area of each rectangular piece of paper, but substituted different values for the length and width of each.

Your child can apply the properties of operations to generate equivalent expressions.

- Generate 2 or more equivalent expressions using the properties.
- Composing and decomposing expressions using the properties.

VOCABULARY

EQUIVALENT EXPRESSIONS means equal expressions.

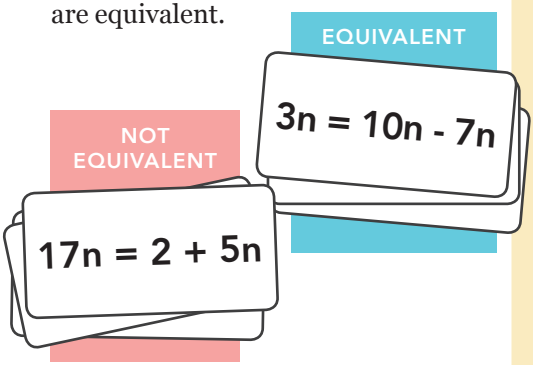
COMPOSE and **DECOMPOSE** means to build up and break down a problem.

HELP AT HOME

- Play "Memory." Make two sets of cards. One set has expressions written on them, the other set has equivalent expressions which have been decomposed (broken down). Make about 7 sets. Shuffle the cards. Place them face down. Have your child match the sets (e.g., 4(n + 5) would match with 4n +20). If your child flips two cards that do not match, then it is your turn to flip two cards. Continue until all matches have been made. The person with the most matches at the end of the game wins.

Your child can identify when two expressions are equivalent.

- Determine whether two expressions are equivalent by using the same value to evaluate both expressions.
- Identify equivalent expressions.
- Use properties of operations to justify two expressions are equivalent.



HELP AT HOME

- Explain to your child that multiplication is a short form of addition. Therefore, 5y = y+y+y+y+y because whatever the value of y is will not change the fact that the two sides of the equation are still equivalent.
- Play a categorizing game, categorize equations as either "yes" (equivalent) or "no" (not equivalent). For example: 17n = 2 +5n (no, because if n = 2, the left side would be 34 and the right side would be 12, so the expressions would not always be equal).

Your child can understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? He can use substitution to determine whether a given number in a specified set makes an equation or inequality true.

- Utilize substitution to decide if an equation or inequality is true.
- Solve an equation or inequality to find the value of the variable.
- Use a four-function calculator to solve equations and inequalities.

HELP AT HOME

- Write an equation or inequality that would have a solution that is on a number cube (dice) or two combined number cubes. Let your child roll the number cube(s) and determine if that number is the solution.
- Encourage your child to work the inverse of the problem to determine what the answer should be.

Your child can use variables to represent numbers and write expressions when solving a real-world or mathematical problem. Your child can understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

- Use variables to represent numbers to solve a real-world problem.
- Determine the function of the variable in a real-world or mathematical problem.
- Write expressions when solving real-world or mathematical problems.
- Identify the relationship of the variable in real-world or mathematical problems.

HELP AT HOME

- Have your child determine the answer to real-world situations where an unknown is given (e.g., Sam ate 2 hot dogs and bought a drink for $1.50. He spent $3.50 on his meal. How much did each hot dog cost?).

Your child can solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q, and x are all non-negative rational numbers.

- Solve equations when the values for the variables are given.
- Write and solve equations that represent real-world problems.
- Add, subtract, multiply and divide whole numbers, fractions, and decimals fluently.
- Evaluate reasonableness of solutions.

HELP AT HOME

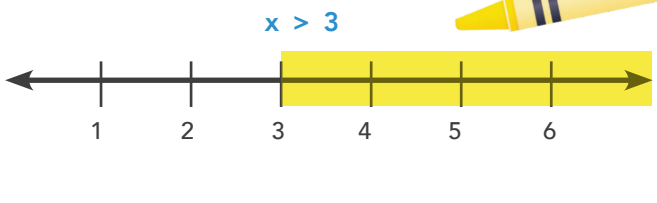
- Create real-world problems for your child to solve, (e.g., Landon had 90 pieces of candy. He ate some. Now he has 78. Write and solve the equation to match this situation. The solution would be 90 – c = 78. The value of c is 12.). Continue with problems that involve various operations and a mixture of fractions, decimals, and whole numbers.

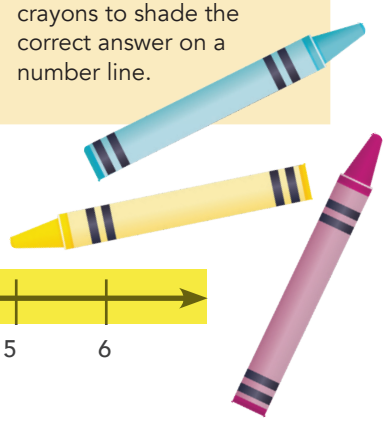
Your child can write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Your child can recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

- Write an inequality to represent constraints or conditions in a real-world or mathematical problem.
- Graph a solution set of an inequality on a number line.
- Explain what the solution set of an inequality represents.

HELP AT HOME

- Ask your child to graph real-world situations. For example, you must be over 3 ft to ride the merry-go-round at the park (x > 3). Begin at 3 and shade numbers that are larger than three to represent possible solutions to the inequality. Allow your child to use crayons to shade the correct answer on a number line.





Your child can use variables to represent two quantities in a real-world problem that change in relationship to one another. Your child can write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. He can also analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

- Analyze tables and graphs to determine the dependent and independent variable.
- Analyze tables and graphs to determine the relationship between dependent and independent variables.
- Write an equation with variables that represents the relationship between the dependent and independent variables.
- Create a table of two variables that represent a real-world situation in which one quantity will change in relation to the other.
- Use data to plot points on the coordinate plane.
- Interpret patterns in the table and graph and relate them back to the equation.
- Use a four-function calculator to determine either variable.

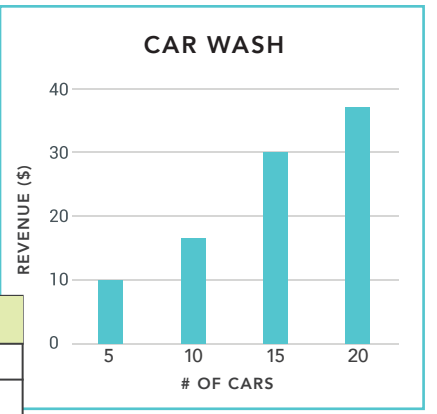
HELP AT HOME

- Have your child locate a graph on the Internet and determine the dependent and independent variables. Then have him create a table to match the graph.

VOCABULARY

The **INDEPENDENT VARIABLE** is independent of the outcome being measured (e.g., the number of cars washed).

The **DEPENDENT VARIABLE** is influenced by the independent variable (e.g., the amount of money raised *depends* on the number of cars washed).



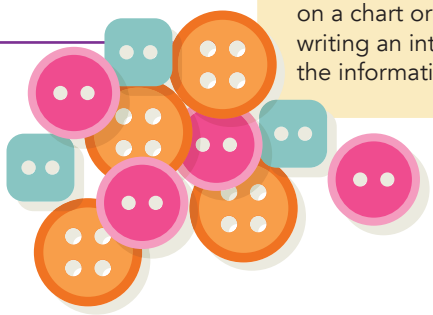
# OF CARS	REVENUE ($)
5	$10
10	$17
15	$30
20	$38

Your child can recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

- Recognize a statistical question.
- Develop a question that can be used to collect statistical information.
- Collect data to demonstrate the variability of the answers to the question.

VOCABULARY

A **STATISTICAL QUESTION** is one that can be answered by collecting data and where there will be variability in the data. For example, Zeke has a jar of buttons he has collected over time. Statistical questions that could be asked about the jar of buttons include: What is the typical number of holes in the buttons in the jar? If Zeke grabbed a handful of buttons, what are the chances that all the buttons in his hand are round? What is the typical size of the buttons in the jar? How are the buttons distributed by color?



HELP AT HOME

- Write questions on strips of paper. Make some of the questions statistical (e.g., How many hours a week do you spend watching television?), and some not statistical (e.g., Who was the first President of the United States?). Let your child pull a strip of paper, read the question, and decide whether or not it is a statistical question. Have him place the slips in two separate piles, statistical and not statistical.
- Help your child choose one of the statistical questions to ask other people. Your child needs to record the data responses and compare and contrast the results to the survey question by placing the information on a chart or graph and writing an interpretation of the information gathered.

Your child understands that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

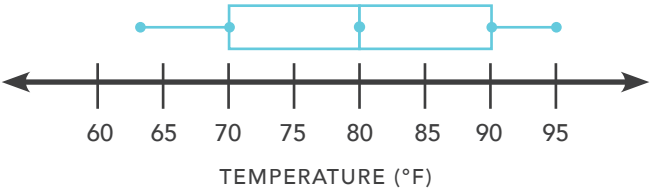
- Describe a distribution of data in terms of center, spread, and overall shape.
- Construct a box plot to show the distribution of a set of data.
- Interpret data from a box plot.
- Compare multiple distributions looking for similar centers, spreads, and overall shapes.

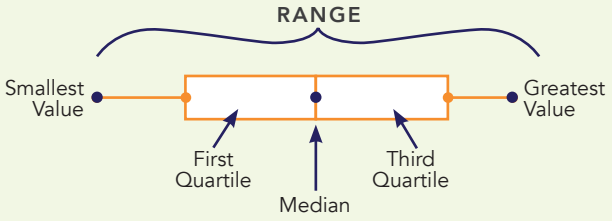
HELP AT HOME

- Ask your child to graph the temperature hourly for a day. Have him determine the overall shape of the graph and organize the information in a box plot (box and whiskers plot). Then have him determine the measures of center and variability for the data.

RESOURCES

SAMPLE BOX AND WHISKERS PLOT





Your child can recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

- Calculate measures of center (mean, median, and mode) of a set of numerical data.
- Calculate measures of variation by calculating range, interquartile range, or mean absolute deviation of a set of numerical data.
- Cannot use a calculator but must be able to use the standard algorithm for calculating.

HELP AT HOME

- Using the computer or newspaper, have your child find a set of data from a recent survey, and determine the mean, median, and mode of the set of data.
- Have your child determine the interquartile range by finding the range between the first and third quartile.
- Have your child determine the distance (absolute value) each number is from the mean. Then conclude by finding the mean of these answers; this is the mean variation of the data.

VOCABULARY

MEAN is also known as the "average." The mean is found by adding up all of the given data and dividing by the number of data entries.

MEDIAN is the middle number in the set of data. First, arrange the numbers in order from lowest to highest, then find the middle number by crossing off the numbers until you reach the middle.

MODE is the number that occurs most often in the set of data.

HELPFUL HINT

Review what a **QUARTILE** is with your child by relating it to money. The first quartile can be compared to 25 cents, the second quartile to 50 cents (half of the information) and the third quartile to 75 cents.

Your child can display numerical data in plots on a number line, including dot plots, histograms, and box plots.

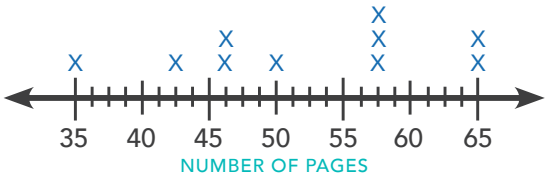
- Organize and display data as a line plot or dot plot.
- Organize and display data in a histogram.
- Organize and display data in a box plot.
- Calculate extremes, range, median, and mean to be able to display data in a box plot.
- Identify a graphical representation representative of a given data set.

HELP AT HOME

- Have your child record how many pages are in 10 different books on a line plot.
- Next, have him organize the information on a histogram.
- Then have him organize the information on a box plot, being sure to mark the quartiles and extremes clearly.
- Last, have your child determine which is the easiest to read and shows the most relevance to the survey.

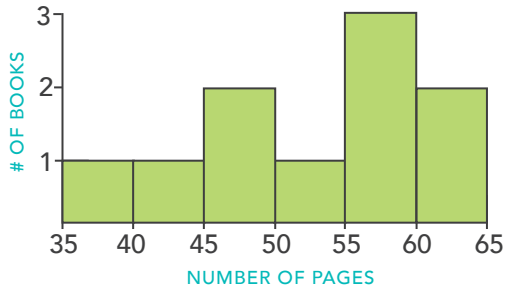
RESOURCES

LINE PLOT



HISTOGRAM

A Histogram is similar to a Bar Chart, but a histogram groups numbers into ranges, and there are no spaces between the "bars."



Your child can summarize numerical data sets in relation to their context such as by reporting the number of observations.

- Use a four-function calculator for rapid calculation of measure of center or variability.
- Report number of observations.

HELP AT HOME

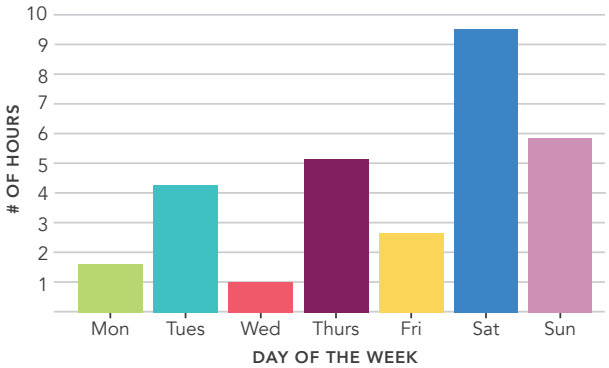
- Have your child determine if survey results are more accurate with more or less observations.

Your child can summarize numerical data sets in relation to their context such as by describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

- Identify the attribute being investigated.
- Identify how the attribute was measured and by what units.

HELP AT HOME

- Have your child graph the amount of television watched each day of the week in your household. Then have him use the graph to determine the amount of television watched in your household in a week. Make sure he can identify the attribute being investigated and how it is measured.



Your child can summarize numerical data sets in relation to their context by giving quantitative measures of center and variability, as well as describing any overall pattern and any striking deviations from the overall pattern with references to the context in which the data were gathered.

- Calculate measures of center: mean, median, and mode.
- Calculate measures of variability: range, interquartile range, and mean absolute deviation.
- Identify clusters, gaps, extremes, and outliers in the data set.
- Describe overall patterns and how those patterns relate to the context of the data.
- Describe any deviations from the overall pattern and how they relate to the context of the data.

HELP AT HOME

- Have your child determine how many words there are per page in his science book in one chapter. Have him record the information and identify the measures of center, measures of variability, clusters, gaps, outliers, patterns, etc.

VOCABULARY

MEASURE OF VARIABILITY are either properties of a probability distribution or sample estimates of them.

The **RANGE OF SAMPLE** is the difference between the largest and smallest value.

An **OUTLIER** is a data point that is distinctly separate from the rest of the data.

The **CENTER** is the middle number.

When data seems to be 'gathered' around a particular value, it is a **CLUSTER.**

A **GAP** is an interval that contains no data.

Your child can summarize numerical data sets in relation to their context by relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

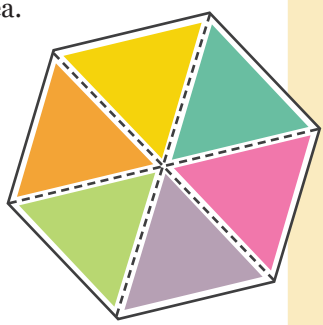
- Calculate measures of center.
- Calculate measures of variability.
- Draw inferences about the shape of the distribution using measures of center and/or variability.
- Justify the use of a particular measure of center or variability based on the shape of the data.

HELP AT HOME

- Using the information from the previous activity and the shape of the data distribution, have your child determine the best measure of center or variability.

Your child can find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. Your child can apply these techniques in the context of solving real-world and mathematical problems.

- Calculate area of triangles and quadrilaterals when given base and height.
- Calculate base or height when given area.
- Compose polygons from triangles.
- Decompose polygons into triangles.
- Solve real-world and mathematical problems.
- Use a four-function calculator to solve for area.

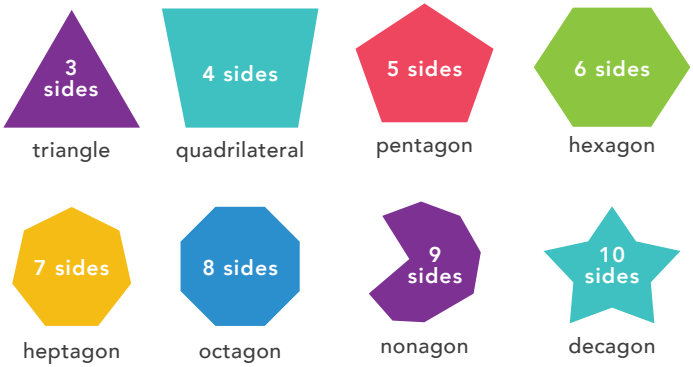


HELP AT HOME

- Using a plain piece of paper as a rectangle, have your child determine the area of the rectangle. Then cut the paper to create two equal triangles. Discuss that a triangle is half of a rectangle so the area is half of the rectangle area.
- Draw a regular hexagon on paper. Have your child decompose it into six equal triangles. Then have him find the area of the hexagon by first finding the base and height of each triangle by measuring in centimeters. He will use that information to determine the area of each triangle. Then have him find the sum of the six triangle areas or multiply the area of one triangle by six to get the total hexagon area.

RESOURCES

A **POLYGON** is a simple closed shape made up of straight line segments only. Polygons are classified according to the number of sides they have.



Your child can find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

- Compute volume after packing a rectangular prism with unit cubes.
- Apply formulas to solve problems with real-world contexts.
- Calculate volume with and without a four-function calculator.
- Evaluate reasonableness of the volume of a prism in regards to its length, width, and height.

HELP AT HOME

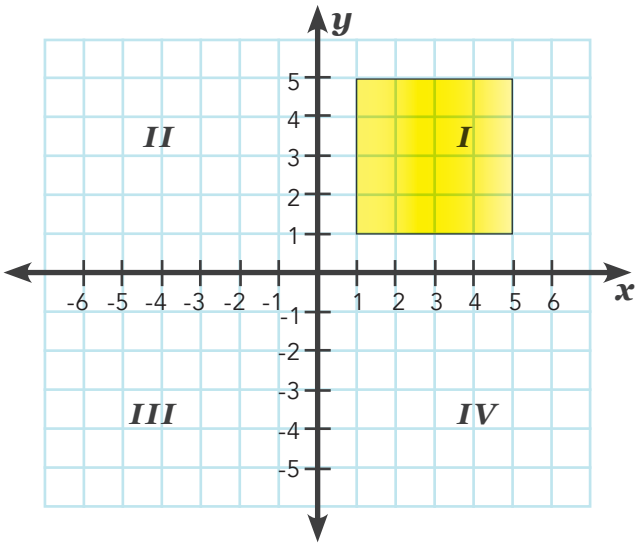
- Have your child determine how many unit cubes or building blocks will fit neatly into a cereal box.
- Using the formula v = lwh (Volume = length × width × height), have your child determine if his answer above was reasonable. (Make sure he measures each side of the box to the nearest 1/4 fraction before multiplying.)

Your child can draw polygons in the coordinate plane given coordinates for the vertices. Your child can use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Your child can also apply these techniques in the context of solving real-world and mathematical problems.

- Draw polygons in the coordinate plane given coordinates for the vertices.
- Use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate.
- Subtract positive and negative numbers.
- Find the perimeter and area of polygons.
- Solve real-world and mathematical problems.

HELP AT HOME

- Draw a square in the first quadrant of a coordinate graph. Have your child determine the length of each side by subtracting coordinates. Then have him determine the perimeter of the square and the area of the square.

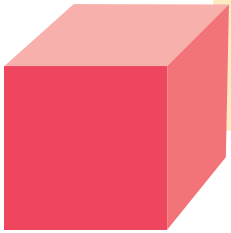


Your child can represent three-dimensional figures using nets (a three-dimensional figure that is flattened) made up of rectangles and triangles, and use the nets to find the surface area of these figures. Your child can apply these techniques in the context of solving real-world and mathematical problems.

- Match nets with corresponding three-dimensional figures.
- Draw nets when given the name of a three-dimensional figure.
- Calculate surface area with and without a four-function calculator.
- Evaluate reasonableness of the surface area considering the lengths and widths of the faces of the figure.
- Solve real-world and mathematical problems.

HELP AT HOME

- Help your child cut an edge to a cereal box and flatten out the box, resulting in the box's net.
- Have your child find the least amount of wrapping paper it would take to cover the box. (This is the surface area of the box.)
- Make flashcards with the solid three-dimensional figure drawn or named on one side and the net drawn on the other. Encourage your child to look at all the attributes of the solid to determine what it is.



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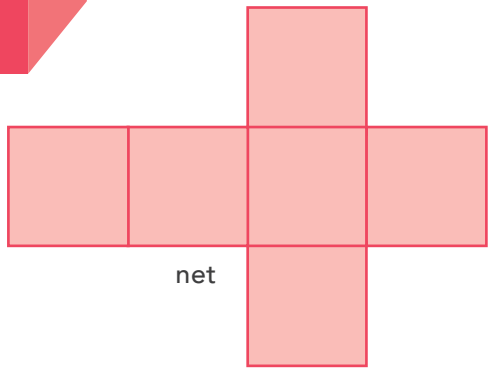

net