MATHEMATICS

In Grade 7, your child will focus primarily on four critical areas. The first is developing an understanding of and applying proportional relationships. In addition, your child will develop an understanding of operations with rational numbers and work with expressions and linear equations. He will also solve problems involving scale drawings and informal geometric constructions, and work with two- and three-dimensional shapes to solve problems involving area, surface area, and volume. The fourth focus area is drawing inferences about populations based on samples.

Activities in these areas include:

- Setting up and solving ratios to include complex fractions.
- Constructing graphs or tables to determine if quantities are proportional and writing equations representing proportional relationships.
- Adding or subtracting up to 3 rational numbers with and without the use of a horizontal or vertical number line.
- Adding and subtracting up to 3 like or unlike fractions and mixed numbers.
- Multiplying and dividing integers and rational numbers.
- Reproducing a scale drawing that is proportional to a given geometric figure using a different scale.
- Identifying corresponding sides of scaled geometric figures.
- Constructing triangles from three given angle measures or from three given side measures.
- Calculating the area of circles, the circumference of circles, and identifying relationships between the two.
- Solving mathematical and real-world problems involving types of angles and their measures.
- Solve mathematical and real-world problems involving area, surface area, and volume of geometric figures.
- Drawing informal comparative inferences about two populations from random samples.

Your child can compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

- Use a four-function calculator or standard algorithm to compute unit rates.
- Set up and solve ratios to include complex fractions.
- Determine when it is appropriate to use unit rate and understand when it has limitations.

HELP AT HOME

- Have your child determine the unit rate by measuring with ingredients (e.g., a recipe needs 1/3 cup of sugar to every 3/4 cup of flour). Let him determine the unit rate of sugar to flour (e.g., 4/9 cups of sugar to every cup of flour).

VOCABULARY

UNIT RATE is the amount per one unit.

Your child can recognize and represent proportional relationships between quantities. Your child can decide whether two quantities are proportional (e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin).

- Use a four-function calculator or standard algorithm to determine if two quantities are proportional.
- Determine proportionality between two quantities that are not whole numbers.
- Construct graphs or tables to determine if quantities are proportional.
- Solve problems beyond those that involve whole number values.
- Determine if data is proportional or not and explain why or why not when given a table of values.

VOCABULARY

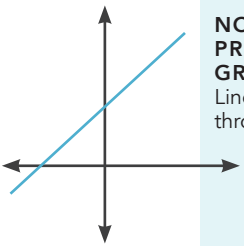
EQUIVALENT is equal.

PROPORTIONAL is when there is the same rate of change.

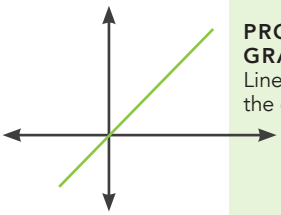
HELP AT HOME

- Have your child pour a liquid into a measuring cup to determine if ½ cup is equivalent to 4/8 cup. Let him fill the cup 1/8 full 4 separate times, pouring the liquid into a separate measuring cup each time. Determine if after 4 times the amounts are proportional or non-proportional.
- Create cards, some with proportional items and others with non-proportional items. Make two piles with the cards: one pile is graphs that are proportional, the other is non-proportional. If the graph has a line that goes through the origin, the graph is proportional. For example: y = 2x ; (1,2) (2,4) (3,6) is proportional because (0,0) would be on the line. However, 2x + 1 would not be proportional because when x = 0, y would equal 1 (0,1).

RESOURCES



NON-PROPORTIONAL GRAPH
Line does not go through the origin.



PROPORTIONAL GRAPH
Line goes through the origin.

Your child can recognize and represent proportions between quantities. Your child can identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

- Identify the unit rate given any of the various forms of proportions.
- Will not be allowed to use a four-function calculator to represent relationships in various forms.
- Create a table of values, a graph, and an equation that will describe the situation and determine if the situation represents a proportion, when given a real-world scenario.
- Compare proportions given in different forms (e.g.,tables, equations, diagrams, verbal expressions, graphs).

HELP AT HOME

- Make a table with your child to show the speed of a car in miles per hour.
- Have your child graph the results and determine if the car was traveling at a constant speed. What was the constant speed?
- Have your child write the equation that represents the speed.

Your child can recognize and represent proportions between quantities. Your child can also represent proportions by equations.

- Solve equations involving proportions without a four-function calculator.
- Write equations representing proportions when provided a real-world context.

HELP AT HOME

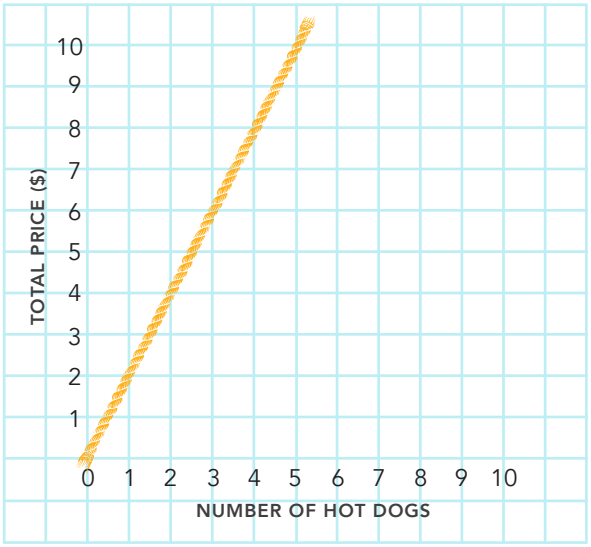
- Ask your child real-world problems that involve proportions (e.g., if Susie made 2 1/2 batches of cookies in 2 hours, how long will it take her to make 10 batches?).
- Have your child write an equation to represent his answer.

Your child can recognize and represent proportional relationships between quantities. Your child can explain what a point (x,y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0,0) and (1,r) where r is the unit rate.

- Interpret a point on the graph of a proportional relationship in terms of the situation.
- Describe what the point (0,0) means in the content in the graph or situation provided.
- Accurately draw a graph when the value of y is proportional to the value of x, and the constant or proportionality is provided.
- Will not be allowed to use a four-function calculator.

HELP AT HOME

- Using the computer to find various graphs that show increase over time, have your child determine if the graph is proportional. Have him determine the unit rate: where is y when x = 1?
- Have your child use yarn to make a line that shows a constant rate on graph paper (e.g., $2 per hot dog). Repeat with various constants.



RESOURCES

See page 17 for examples of proportional and non-proportional graphs.

Your child can use proportional relationships to solve multi-step ratio and percent problems.

- Use a four-function calculator or standard algorithm to solve multi-step ratio problems.
- Set up and solve multi-step problems involving real-world percentages.
- Determine when it is appropriate to use unit rate and understand when it has limitations.

HELP AT HOME

- When shopping, allow your child to determine what the sales tax amount will be using a calculator. Discuss that commission and gratuities are solved using the same process.
- Let your child determine the discount amount and final price of an item using percentage.

VOCABULARY

GRATUITIES are "tips" we give a server for a job well done. Common amounts are 10%, 15% or 20% of the original price.

A **COMMISSION** is a percentage of a sale that a worker earns.

Your child can apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; and can represent addition and subtraction on a horizontal or vertical number line diagram. Your child can also describe situations in which opposite quantities combine to make zero.

- Use a horizontal or vertical number line to add and subtract.
- Answer questions in a real-world context.

HELP AT HOME

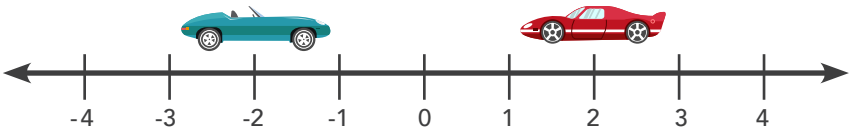
- Use a thermometer to help your child understand adding and subtracting on a number line.
- Have your child give you a situation when the result would be 0 (e.g., the temperature rose 5 degrees by noon, but dropped 5 degrees by dark, thus the overall change was 0).
- Discuss when the result is negative and when the result is positive.
- Determine answers to real-world problems such as: During a football game, Danny lost 7 yards on a down. At the end of the next down he gained 5 yards. Explain what his team needs to do to show a positive gain of yardage on the next down.

Your child can apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; and represent addition and subtraction on a horizontal or vertical number line diagram. Your child can understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Your child can show that a number and its opposite have a sum of 0 (additive inverses) and can interpret sums of rational numbers by describing real-world contexts.

- Use a horizontal or vertical number line to illustrate p + q and p + (-q).
- Use a horizontal or vertical number line to illustrate p + (-p) = (-p) +p = 0.
- Determine the possible values of numbers that are a given distance from a known number.
- Explain, in a real-world context, the sum of rational numbers.

HELP AT HOME

- Place toy cars on a number line facing each other on opposite sides of zero, the same distance from zero. Have your child compare the distance each car will travel to zero.
- Place a toy car at a given location. Have your child add 3 units in the positive direction by moving the car 3 units to the right. Where is the car located after the move? Repeat by moving the car in a negative direction.

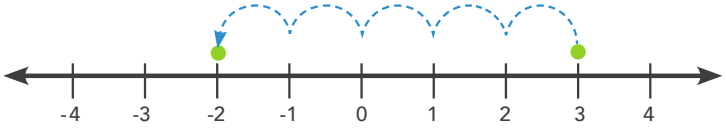


Your child can apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; and represent addition and subtraction on a horizontal or vertical number line diagram. Your child can understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). Your child can also show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

- Use a horizontal or vertical number line to illustrate p + q, p + (-q), and p + (-p) = (-p)+p = 0.

HELP AT HOME

- Use a number line to help your child solve subtraction or addition problems with opposite signs. Recognize the answer is the absolute value of the difference of the integers.



Distance between two integers on a number line = Absolute value of the difference of the integers

$3 - (-2) = |5|$
$|5| = 5$

OR

$-2 - 3 = |-5|$
$|-5| = 5$

Your child can apply and extend previous understandings of addition and subtraction to add and subtract rational numbers. Your child can also represent addition and subtraction on a horizontal or vertical number line diagram, and apply properties of operations as strategies to add and subtract rational numbers.

- Use a four-function calculator with square root to add and subtract rational numbers.
- Add or subtract up to three rational numbers both with and without the use of a horizontal or vertical number line.
- Add and subtract up to three like or unlike fractions and mixed numbers.
- Demonstrate conceptual understanding by producing, or recognizing, an expression equivalent to a given sum or difference.

HELP AT HOME

- Have your child practice adding and subtracting fractions and mixed numbers, some with a common denominator and some without a common denominator.
- Using a calculator, have your child practice adding and subtracting decimals and square roots on a calculator.

VOCABULARY

$\frac{1}{2}$

NUMERATOR is the top number in a fraction.

DENOMINATOR is the bottom number in a fraction.

Your child can apply and extend previous understandings of multiplication and division, and of fractions, to multiply and divide rational numbers. Your child can understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1) (-1) = 1 and the rules for multiplying signed numbers. He can also interpret products of rational numbers by describing real-world contexts.

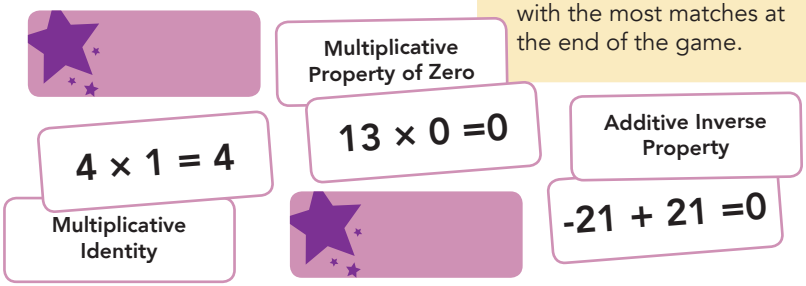
- Multiply integers and rational numbers.
- Write properties for given mathematical statements.
- Solve real-world problems involving multiplication of integers.
- Demonstrate conceptual understanding by producing or recognizing equivalent expressions using properties of operations.

HELP AT HOME

- Review with your child how to multiply integers and rational numbers.
- Create a memory game matching the property to the example. Properties need to include: Multiplicative Property of Zero, Additive Inverse Property, Distributive Property, and Multiplicative Identity. Shuffle the cards, turn face down, then have your child turn two over. If they match, he keeps the cards; if not, he will turn the card back over and the next person takes a turn. The winner is the person with the most matches at the end of the game.

RESOURCES

See page 26 for a table describing several math properties.



RESOURCES

Below is a table describing some math properties.

Name	Hints	Example	Notes
Associative "Grouping"	You "associate" with different groups.	$5 + (15 + 4) = (5 + 15) + 4$	Works with addition and multiplication, not subtraction or division.
Commutative "Ordering"	Since Commutative has an "o" in it, think "order".	$5 + 4 + 3 = 4 + 3 + 5$	Works with addition and multiplication, not subtraction or division.
Distributive "Distributing or Pushing Through Parentheses"	Think of "distributing" something to your friends.	$5 \times (3 + 4) = 5 \times 3 + 5 \times 4 = 15 + 20 = 35$ $5 - 2(x - 3) = 5 - 2x + 6$ $5x + 7x = (5 + 7)x = 12x$	When negatives are on the outside of the parenthesis, make sure you distribute the negatives to second number, too. Remember that multiplying two negatives results in a positive.
Identity "Staying the Same"	You always come back to your "identity".	$9 + 0 = 9$ $9 \times 1 = 9$	Additive identity is 0. Multiplicative identity is 1.
Inverse "Undoing"	When you put your car in "inverse", you go backwards.	$9 + -9 = 0$ $9 \times \frac{1}{9} = 1$	Additive inverse is $-a$, since $-a + a = 0$. Multiplicative inverse is $\frac{1}{a}$, since $\frac{1}{a} \times \frac{a}{1} = 1$. Note that the inverse of $\frac{a}{b}$ is $\frac{b}{a}$, since $\frac{a}{b} \times \frac{b}{a} = 1$.

Image from http://stjohnsmath.weebly.com/133.html

Your child can apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Your child can understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then (p/q) = (-p)/q = p/(-q). Interpret quotients of rational numbers by describing real-world contexts.

- Divide integers and rational numbers.
- Solve real-world problems involving division of integers and rational numbers.
- Evaluate an expression using division.
- Demonstrate conceptual understanding by producing or recognizing equivalent expressions using properties of operations.

HELP AT HOME

- Ask your child questions such as: If Tom owes Sam $10 (-10), can two people give Tom $5 each (-5 and -5), such that Tom now owes each of them $5? Will his debt to Sam be paid in full?
- Discuss with your child the steps to dividing rational numbers and integers. Discuss if it affects the answer if the negative number is in the numerator or denominator of a fraction.

Your child can apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. Apply properties of operations as strategies to multiply and divide rational numbers.

- Multiply and divide up to three rational numbers.
- Demonstrate conceptual understanding by producing or recognizing equivalent expressions using properties of operations.

HELP AT HOME

- Extend one of the games played in previous activities by including examples with up to three numbers.

Your child can apply and extend previous understandings of multiplication and division, and of fractions, to multiply and divide rational numbers. Your child can convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

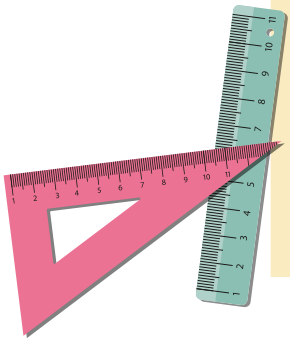
- Write a fraction or a mixed number as a decimal using long division.
- Write a decimal as a fraction or mixed number in simplest form.
- Use long division to express fractions as decimals.
- Explain which fractions will result in terminating or repeating decimals.

HELP AT HOME

- Review with your how to do a long division algorithm. Discuss that the divisor can be larger than the dividend, resulting in a number less than one.
- Have your child classify fractions as terminating (stopping), repeating, or not terminating (not stopping) decimals.
- Using place value, have your child convert a decimal to a fraction.

Your child can solve real-world and mathematical problems involving the four operations with rational numbers.

- Add, subtract, multiply, and divide rational numbers when provided a real-world context.



HELP AT HOME

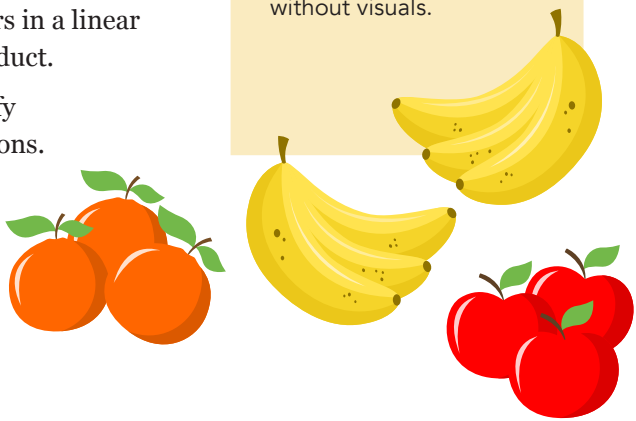
- Use measurement tools, such as a measuring cup, to review adding and subtracting rational numbers with your child.
- Help your child find the area of a rectangle with rational dimensions.
- Have your child find the length of a rectangle given the area and the width.

Your child can apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational numbers.

- Add, subtract, factor, and expand linear expressions with and without rational coefficients.
- Utilize properties of operations to rewrite expressions in a different form.
- Use division to express a linear expression by its factors and then also expand by using multiplication to rewrite the factors in a linear expression as a product.
- Produce and identify equivalent expressions.

HELP AT HOME

- Group fruit. Place 3 apples, 3 oranges, and 6 bananas on the table. Put the fruit in groups of 3 (e.g., 1 group of apples, 1 group of oranges, and 2 groups of bananas). Relate to the problem: $3x + 3y + 6z = 3(x + y + 2z)$. Repeat with and without visuals.



Your child can understand that rewriting an expression in different forms within the problem can shed light on the problem and how the quantities in the problem are related.

- Write an expression from a real-world experience, possibly involving sales tax, tip, discount, gratuity, markup, selling price, perimeter, area, and angle measures of a triangle.
- Evaluate an expression given a value for the variable.
- Translate verbal expression into an algebraic expression.
- Use manipulatives such as algebra tiles to factor expressions.

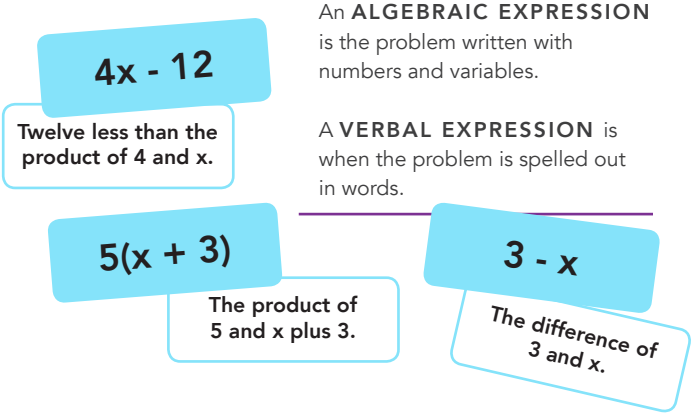
HELP AT HOME

- Have your child solve a sales tax question. Tell him to highlight where the numbers changed from one form (percent) to another (fraction or decimal) to make the problem easier.
- Make flashcards on which one side has the algebraic expression, the other side has the verbal expression.

VOCABULARY

An **ALGEBRAIC EXPRESSION** is the problem written with numbers and variables.

A **VERBAL EXPRESSION** is when the problem is spelled out in words.

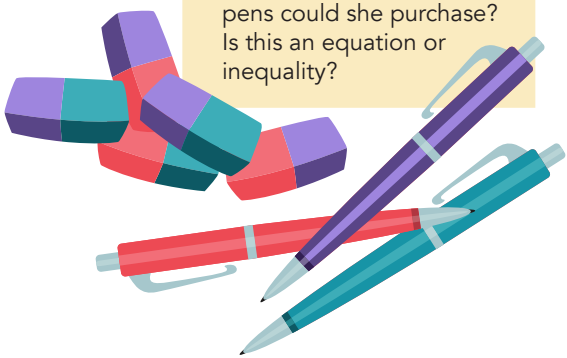


Your child can use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. Your child is able to solve word problems leading to equations of the form px + q = r and p(x+q) = r where p, q, and r are specific rational numbers. He can solve equations of these forms fluently, and can also compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.

- Solve multi-step equations derived from word problems.
- Use arithmetic from a given problem to generalize an algebraic solution.
- Explain how to determine whether to write an equation or inequality and the properties of the real number system that was used to find a solution.

HELP AT HOME

- On a set of steps in your house, have your child solve each step of a given problem on a different step. This helps your child remember to show and explain the "steps" to his solution. Create problems such as: Macy bought 5 erasers for $2.50 each. She then bought some pens that were $2.00 each. She only had $30. How many pens could she purchase? Is this an equation or inequality?



Your child can use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. Your child can solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q and r are specific rational numbers. He can also graph the solution set of the inequality and interpret it in the context of the problem.

- Solve multi-step inequalities derived from word problems.
- Graph the solution set of the inequality.
- Use arithmetic from a given problem to generalize an algebraic solution.
- Explain how to determine whether to write an equation or inequality and the properties of the real number system that was used to find a solution.

HELP AT HOME

- Solve real-world problems involving equations or inequalities. For example, Ronnie makes $12.50 an hour, plus $2 for each sale. If he worked 20 hours and his paycheck was over $260, how many sales did he make? Repeat with similar problems. Have your child explain how he determined if it was an equation or inequality. To extend learning, have your child graph each solution on a number line.

VOCABULARY

An **EQUATION** has an equal (=) sign.

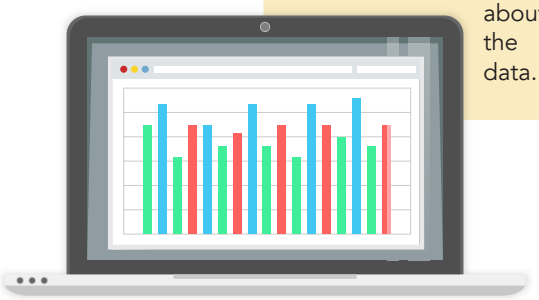
An **INEQUALITY** has a greater (>) or less (<) than sign.

Your child can understand that statistics can be used to gain information about a population by examining a sample of the population. He knows generalizations about a population from a sample are valid only if the sample is representative of that population. He also understands that random sampling tends to produce representative samples and support valid inferences.

- Use a four-function calculator to assist in determining statistics.
- Apply statistics to gain information about a population from a sample of the population.
- Determine statements that are supported by data obtained from a survey as it pertains to the whole population and not just the sampling provided.

HELP AT HOME

- Have your child do a survey where random people are asked questions. Have him use people for his survey who do not have a lot in common. Be sure it is a random population (e.g., ask people of varying ages how often they watch television).
- Using graphs from the Internet, have your child practice interpreting information. Use this information to help come to conclusions about the data.



Your child can use data from a random sample to draw inferences about a population with an unknown characteristic of interest. He is also able to generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

- Use a four-function calculator to assist in determining statistics.
- Compare a random sample to the overall population.
- Describe a method of sampling to answer simple questions about the population in all, based on a large amount of data.

HELP AT HOME

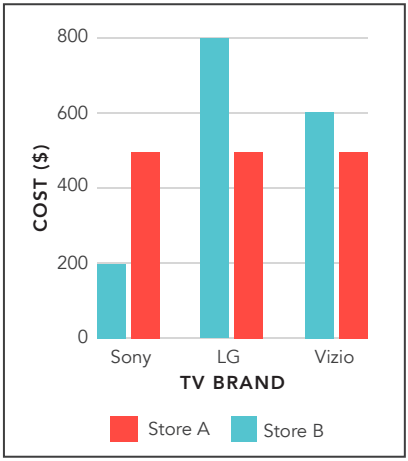
- Have your child estimate the word length on a page in a book by doing a random sample of various length words on the page.
- Allow your child to use your social media account(s) to do a random survey (e.g., how many people prefer chicken over beef). Then have him take the information and record it in a table.

Your child can informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

- Use a four-function calculator to assist in determining statistics.
- Use data from two populations to persuade two different sides of an argument.
- Use mean absolute deviation or range as a measure of variability in a task.
- Compare two numerical data distributions on a graph by using visual data displays, and assessing the degree of overlap.
- Compare the differences in the measure of central tendency in two numerical data distributions by measuring the difference between the centers.

HELP AT HOME

- Help your child research prices for various TV brands at two different stores. Have him make a graph of each store's data and determine the centers of each set of data. Then have him compare the results.



Your child can use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

- Use a four-function calculator to assist in determining statistics.
- Draw informal comparative inferences about two populations from random samples.

HELP AT HOME

- Have your child decide whether the word "the" is generally used more often on 5 pages of a newspaper or 5 pages of a magazine.

Your child can understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. He knows larger numbers indicate greater likelihood and probability near 0 indicates an unlikely event. He understands a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

- Use a four-function calculator to assist in determining probability.
- Draw conclusions to determine that a greater likelihood occurs as the number of favorable outcomes approaches the total number of outcomes.

HELP AT HOME

- Using a regular deck of cards, have your child determine various probabilities (e.g., probability of choosing a red face card = 6/52 or 3/26).
- Discuss with your child if the solution is unlikely, likely, or neither.

Your child can approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and also predict the approximate relative frequency given the probability.

- Use a four-function calculator to assist in determining probability.
- Compare experimental results to theoretical predictions.
- Predict the relative frequency (experimental probability) of an event based on the (theoretical) probability.

HELP AT HOME

- Have your child predict how many times a certain number will occur when you roll dice or a number cube (theoretical). Then have him do the experiment and compare the actual results (experimental) to the theoretical probability.

Your child can develop a probability model and use it to find probabilities of events. He can compare probabilities from a model to observed frequencies, and if the agreement is not good, explain possible sources of the discrepancy. He is able to develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.

- Use a four-function calculator to assist in determining probability.
- Develop a uniform probability model and use it to determine the probability of each outcome/event.
- Analyze a probability model and justify why it is uniform or explain the discrepancy if it is not.

HELP AT HOME

- Develop various activities for your child to conduct to determine probability of events. For example: make a spinner and determine if outcomes are fair. Are spaces the same size? Are there equal chances for each choice?

Your child can develop a probability model and use it to find probabilities of events. He can compare probabilities of events and is able to compare probabilities from a model to observed frequencies. If the agreement is not good, he can explain possible sources of the discrepancy. He can also develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.

- Use a four-function calculator to assist in determining probability.
- Use data provided for tasks assigned. If the task is technology-enhanced, the task can simulate a data-gathering process.
- Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.

HELP AT HOME

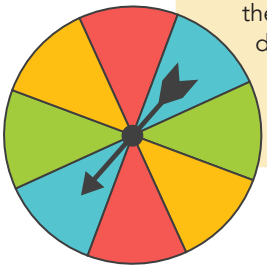
- Create various activities where the outcomes are not fair. Have your child determine the probability that the event will occur. Ask your child which will most likely occur the most often? The least often? Why?

Your child can find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. He can understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

- Use a four-function calculator to assist in determining probability.
- Define and describe a compound event.

HELP AT HOME

- Create two situations (e.g., spinner and rolling a number cube). Have your child determine the probability of spinning a certain color and rolling a certain number. Then have him multiply the two probabilities to determine the probability of the compound event occurring.



Your child can find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. He can represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams.

- Use a four-function calculator to assist in determining probability.
- Complete a table to display possible outcomes of a compound event.

HELP AT HOME

- Make a table to record results from a previous activity.

Your child can find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. He is able to design and use a simulation to generate frequencies for compound events.

- Use a four-function calculator to assist in determining probability.
- Design and use a simulation to generate frequencies for compound events.

HELP AT HOME

- Create a simulation for a given event. For example: Make a spinner with four equal sections labeled A, B, C, and D. Have your child use the spinner to predict the probability of an answer being A on a 100-question multiple choice test by spinning the spinner 100 times (rather than actually taking the test).

Your child can solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

- Use a four-function calculator to determine actual lengths and area of scale drawings.
- Solve problems involving scale drawings when given mathematical or real-world problems.
- Reproduce a scale drawing that is proportional to a given geometric figure using a different scale.
- Identify corresponding sides of scaled geometric figures.

HELP AT HOME

- Have your child determine what the scale ratio is for the length and width of a 4 x 5 photo to an 8 x 10 photo.
- Given a scale ratio of 1cm = 2 feet, have your child draw a scale drawing of a particular room in your house, by first measuring the actual length and width of the room in feet.

VOCABULARY

$$\text{SCALE RATIO} = \frac{\text{amount on paper}}{\text{actual amount}}$$

Your child draws geometric shapes with given conditions. He can focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

- Use a four-function calculator to assist in identifying angle measures found in geometric shapes.
- Solve mathematical problems involving the construction of triangles.
- Construct triangles from three given angle measures.
- Construct triangles from three given side measures.

HELP AT HOME

- Make a set of cards with various side lengths and angle measures written on them. Have your child pull three cards and determine if it is possible to make a triangle with the three dimensions. If so, have your child determine if there is more than one way to draw the triangle with the same dimensions.

Your child can describe the two-dimensional figures that result from slicing three-dimensional figures, as plane sections of right rectangular prisms and right rectangular pyramids.

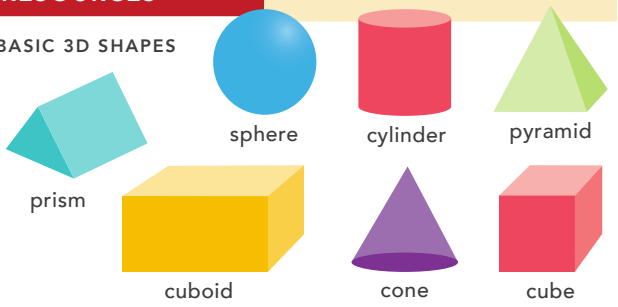
- Use a four-function calculator to assist in describing two-dimensional figures resulting from slicing three-dimensional figures.
- Solve simple real-world problems or mathematical problems involving two and three-dimensional figures.

HELP AT HOME

- Have your child make three-dimensional figures with play dough. Then have him slice the top off with a string. What shape did the slice create? Repeat this activity with various kinds of slices and shapes.

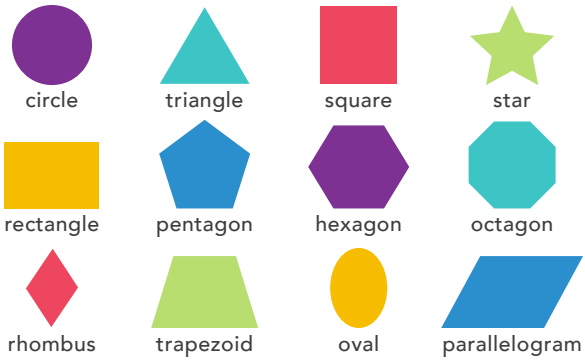
RESOURCES

BASIC 3D SHAPES



RESOURCES

BASIC 2D SHAPES



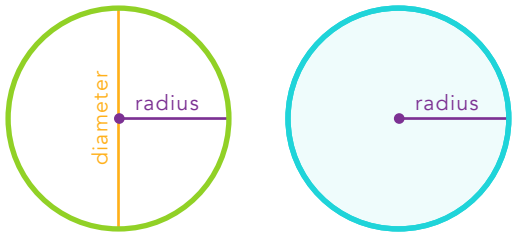
Your child can identify the formulas for the area and circumference of a circle and use them to solve problems. He is able to give an informal derivation of the relationship between the circumference and area of a circle.

- Use a four-function calculator to assist with calculating the area of circles, the circumference of circles, and when identifying relationships between the two.
- Write answers in terms of π when directed.
- Identify and produce a logical conclusion about the relationship between the circumference and the area of a circle.

HELP AT HOME

- Have your child determine the circumference of the lid to a whipped topping bowl, and the area of the lid. Next have him determine the circumference of the lid to a pickle jar, and the area of the lid. Then have him compare and contrast the different circumferences, areas, and lids.

RESOURCES



CIRCUMFERENCE

$C = 2\pi r$ OR $C = d\pi$

AREA

$A = \pi r^2$

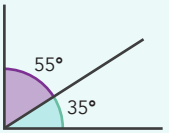
Your child uses facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure.

- Use a four-function calculator to assist in classifying and solving problems dealing with various types of angles.
- Solve mathematical and real-world problems involving types of angles and their measures.
- Determine the complements and supplements of a given angle.

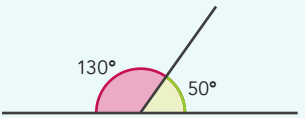
HELP AT HOME

- Help your child make flashcards with the name of the angle on one side and an example or definition on the other side. Include angle measures on some, with their compliment or supplement on the other side.
- In your home, have your child determine where there are examples of supplementary, complementary, vertical, and adjacent angles (e.g., angles in tiles, angles made when a door opens, angles in a quilt pattern).

RESOURCES

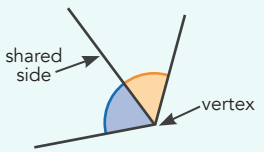


COMPLEMENTARY ANGLES
Two angles with a sum of 90°

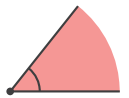


SUPPLEMENTARY ANGLES
Two angles with a sum of 180°

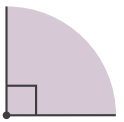
VERTICAL ANGLES
Opposite angles formed by two intersecting lines



ADJACENT ANGLES
Share a side and a common vertex



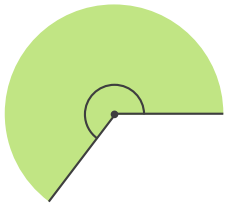
ACUTE ANGLE
Less than 90°



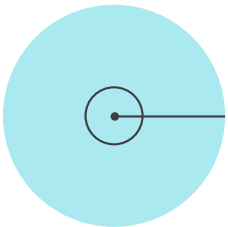
RIGHT ANGLE
Exactly 90°

STRAIGHT ANGLE
Exactly 180°

OBTUSE ANGLE
Greater than 90° but less than 180°



REFLEX ANGLE
Greater than 180°



FULL ROTATION
Exactly 360°

Your child can solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

- Use a four-function calculator to assist in calculating the area of two- and three-dimensional figures.
- Solve mathematical and real-world problems involving area, surface area, and volume of geometric figures.
- Use formulas involving whole numbers, fractions, decimals, ratios, and various units of measure with same system conversions.

HELP AT HOME

- Have your child determine the volume of a cereal box. Then have him determine the surface area of the box by finding the sum of the area of each face. Repeat with various size boxes that would involve fraction measurements.