Big Ideas Math: California Course 1

Parent Newsletter

Chapter 1: Numerical Expressions and Factors

Standards

California Common Core:

6.NS.2: Fluently divide multi-digit numbers using the standard algorithm.

6.NS.4: 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. 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.

6.EE.1: Write and evaluate numerical expressions involving whole-number exponents.

6.EE.2b: Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.

Key Terms

A ***power*** is a product of repeated factors.

The ***base*** of a power is the repeated factor.

The ***exponent*** of a power indicates the number of times the base is used as a factor.

The square of a whole number is a ***perfect square***.

A ***numerical expression*** is an expression that contains only numbers and operations.

To ***evaluate*** a numerical expression, use the order of operations to find the value of a numerical expression.

The ***order of operations*** is the order in which to perform operations when evaluating with more than one operation.

Two whole numbers other than zero that are multiplied together to get a product are called a ***factor pair***.

A ***Venn diagram*** uses circles to describe relationships between two or more sets.

Factors that are shared by two or more numbers are called ***common factors***.

The greatest of the common factors of two or more numbers is called the ***greatest common factor*** (GCF).

Multiples that are shared by two or more numbers are called ***common multiples***.

The least of the common multiples of two or more numbers is called the ***least common multiple*** (LCM).

The ***least common denominator*** (LCD) of two or more fractions is the least common multiple (LCM) of the denominators.

Students will...

Determine which operation to perform.

Divide multi-digit numbers.

Write expressions as powers.

Find values of powers.

Evaluate numerical expressions with whole-number exponents.

Use divisibility rules to find prime factorizations of numbers.

Use diagrams to identify common factors.

Find greatest common factors.

Use diagrams to identify common multiples.

Find least common multiples.

Use least common multiples to add and subtract fractions.

Essential Questions

How do you know which operation to choose when solving a real-life problem?

How can you use repeated factors in real-life situations?

What is the effect of inserting parentheses into a numerical expression?

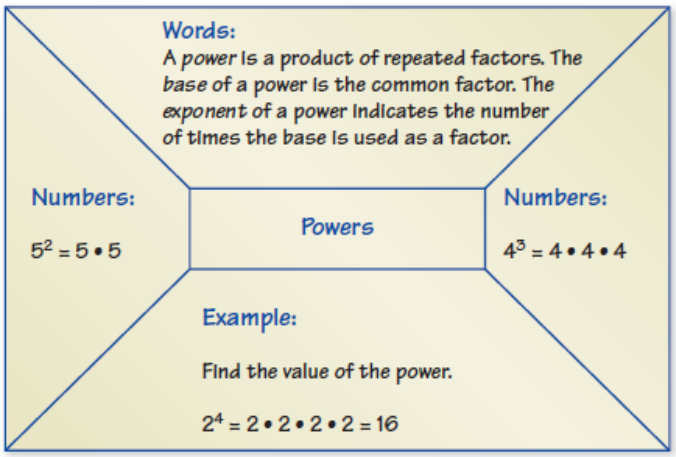
Without dividing, how can you tell when a number is divisible by another number?

How can you find the greatest common factor of two numbers?

How can you find the least common multiple of two numbers?

Reference Tools

An **Information Frame** can be used to help organize and remember concepts. Write the topic in the middle rectangle. Then write related concepts in the spaces around the rectangle. Related concepts can include *Words*, *Numbers*, *Algebra*, *Example*, *Definition*, *Non-Example*, *Visual*, *Procedure*, *Details*, and *Vocabulary*. Place information frames on note cards to use as a quick study reference.



Quick Review

- A *prime number* is a whole number greater than 1 whose only factors are 1 and itself.
- To find the factors of a number, try to divide the number by prime numbers that are less than the given number.
- When parentheses are used in an expression, the operation(s) within the parentheses are performed first.
- A number is divisible by another number if the second number is a factor of the first number.
- Every composite number has only one prime factorization.
- Two numbers that have only 1 as a common factor are called *relatively prime*.
- The GCF can be found by determining which prime factors the numbers have in common.
- The GCF of two numbers will always be less than or equal to the lesser of the two original numbers.
- The LCM of two numbers will always be greater than or equal to the greater of the two original numbers.

Key Ideas

Order of Operations

1. Perform operations in **P**arentheses.
2. Evaluate numbers with **E**xponents.
3. **M**ultiply or **D**ivide from left to right.
4. **A**dd or **S**ubtract from left to right.

Prime Factorization

- The **prime factorization** of a composite number is the number written as a product of its prime factors.
- You can use factor pairs and a **factor tree** to help find the prime factorization of a number.
- A factor tree is complete when only prime factors appear in the product.

Games

- Choose Wisely
- 5 is Alive
- 6 Sticks
- 7 Not 11
- 8 is Great
- 9 is Fine
- Can 3=2?
- More Fours
- Pick Your Fraction
- Fun with Fractions

These are available online in the *Game Closet* at www.bigideasmath.com.

What's the Point?

The ability to understand and manipulate expressions and factors is very useful in real life for events like budgeting for a shopping trip. The next time you go to the grocery store, have your student calculate the total cost (before tax) of the items in your shopping cart. Don't forget to include any coupons or discounts as well as multiples of identical items.

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 1: Filling Piñatas STEM Video is available online at www.bigideasmath.com.

Big Ideas Math: California Course 1

Parent Newsletter

Chapter 2: Fractions and Decimals

Standards

California Common Core:

6.NS.1: 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.

6.NS.3: Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Key Term

Two numbers whose product is 1 are ***reciprocals***.

Games

- Fun with Fractions
- Pick Your Polygon
- Name the Number
- Let's Go Shopping
- Amazing Decimals

These are available online in the *Game Closet* at www.bigideasmath.com.

Essential Questions

What does it mean to multiply fractions?

How can you divide by a fraction?

How can you model division by a mixed number?

How can you add and subtract decimals?

How can you multiply decimals?

How can you use base ten blocks to model decimal division?

Students will...

Use models to multiply fractions.

Multiply fractions by fractions.

Write reciprocals of numbers.

Use models to divide fractions.

Divide fractions by fractions.

Use models to divide mixed numbers.

Divide mixed numbers.

Use models to add and subtract decimals.

Add and subtract decimals.

Use models to multiply decimals.

Multiply decimals.

Use models to divide decimals.

Divide decimals.

Solve real-life problems.

Key Ideas

Multiplying Fractions

- Multiply the numerators and multiply the denominators.
- $\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$, where $b, d \neq 0$.

Multiplying Mixed Numbers

- Write each mixed number as an improper fraction.
- Then multiply as you would with fractions.

Dividing Fractions

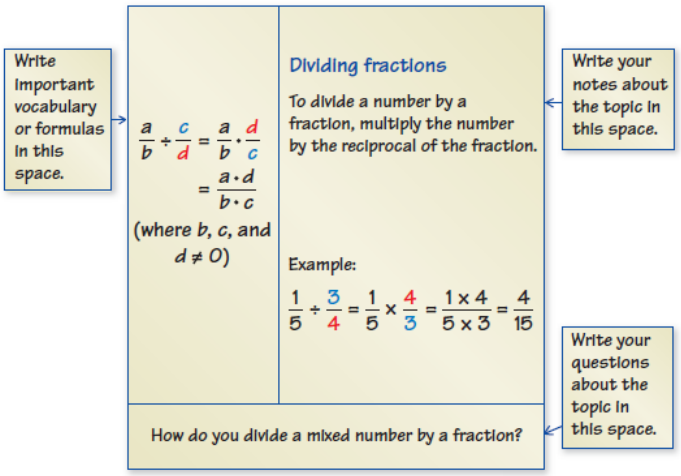
- To divide a number by a fraction, multiply the number by the reciprocal of the fraction.
- $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c}$, where b, c, and $d \neq 0$

Dividing Mixed Numbers

- Write each mixed number as an improper fraction.
- Then divide as you would with proper fractions.

Reference Tools

A **Notetaking Organizer** can be used to write notes, vocabulary, and questions about a topic. In the space on the left, write important vocabulary or formulas. In the space on the right, write notes about the topic. In the space at the bottom, write questions about the topic.



Quick Review

- Cross multiply when an equal sign is between fractions.
- Multiply the numerators and denominators when there is a multiplication symbol between fractions.
- To express a whole number as an improper fraction, put it over a denominator of 1.
- To write the reciprocal of a number, write the number as a fraction. Then invert the fraction. So, the reciprocal of a fraction $\frac{a}{b}$ is $\frac{b}{a}$, where a and $b \neq 0$.

Key Ideas

Adding and Subtracting Decimals

- To add or subtract decimals, write the numbers vertically and line up the decimal points.
- Then bring down the decimal point and add or subtract as you would with whole numbers.

Multiplying Decimals by Whole Numbers

- Multiply as you would with whole numbers.
- Then count the number of decimal places in the decimal factor.
- The product has the same number of decimal places.

Multiplying Decimals by Decimals

- Multiply as you would with whole numbers.
- Then add the number of decimal places in the factors.
- The sum is the number of decimal places in the product.

Dividing Decimals by Whole Numbers

- Place the decimal point in the quotient above the decimal point in the dividend.
- Then divide as you would with whole numbers.
- Continue until there is no remainder.

Dividing Decimals by Decimals

- Multiply the divisor *and* the dividend by a power of 10 to make the divisor a whole number.
- Then place the decimal point in the quotient and divide as you would with whole numbers.
- Continue until there is no remainder.

What's the Point?

The ability to work with fractions and decimals is very useful in real life for events like baking multiple batches of cookies for a bake sale. Bake some of your student's favorite cookies and try doubling or tripling the batch. Have them figure out how much of each ingredient is needed to make the cookies. For example, if a single batch calls for ¾ cups of sugar, then a triple batch would call for 3 * ¾ cups of sugar.

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 2: Space is Big STEM Video is available online at www.bigideasmath.com.

Big Ideas Math: California Course 1

Parent Newsletter

Chapter 3: Algebraic Expressions and Properties

Standards

California Common Core:

6.NS.4: 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. 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.

6.EE.2a: Write expressions that record operations with numbers and with letters standing for numbers.

6.EE.2c: Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).

6.EE.3: Apply the properties of operations to generate equivalent expressions.

6.EE.4: Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).

Essential Questions

How can you write and evaluate an expression that represents a real-life problem?

How can you write an expression that represents an unknown quantity?

Does the order in which you perform an operation matter?

How do you use mental math to multiply two numbers?

Students will...

Use order of operations to evaluate algebraic expressions.

Use variables to represent numbers in algebraic expressions.

Write algebraic expressions.

Use properties of operations to generate equivalent expressions.

Use the Distributive Property to find products.

Use the Distributive Property to simplify algebraic expressions.

Use the Distributive Property to produce equivalent expressions.

Solve real-life problems.

Key Term

An ***algebraic expression*** is an expression that may contain numbers, operations, and one or more symbols.

Parts of an algebraic expression are called ***terms***.

A symbol that represents one or more numbers is called a ***variable***.

The numerical factor of a term that contains a variable is a ***coefficient***.

A term without a variable is called a ***constant***.

Expressions with the same value are ***equivalent expressions***.

In an algebraic expression, ***like terms*** are terms that have the same variables raised to the same exponents.

Writing a numerical expression or algebraic expression as a product of factors is called ***factoring the expression***.

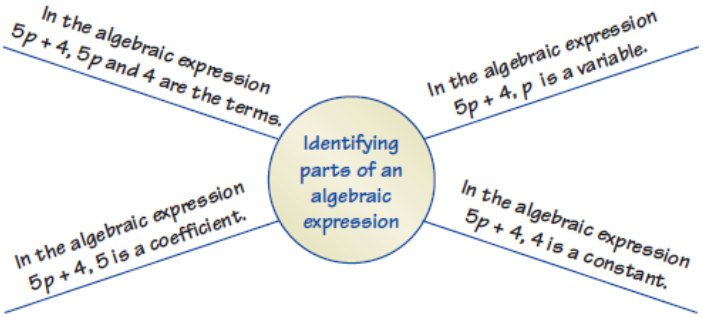
Game

- A Trick for You

This is available online in the *Game Closet* at www.bigideasmath.com.

Reference Tools

An **Information Wheel** can be used to organize information about a concept. Write the concept in the middle of the "wheel." Then write information related to the concept on the "spokes" of the wheel. Related information can include, but is not limited to: vocabulary words or terms, definitions, formulas, procedures, examples, and visuals. This type of organizer serves as a good summary tool because any information related to a concept can be included.



Quick Review

- A variable by itself has a coefficient of 1.
- To evaluate an algebraic expression, substitute a number for each variable. Then use the order of operations to find the value of the numerical expression.
- When you factor an expression, you can *factor out* any common factor.
- When simplifying a fraction, look for common factors between the numerator and denominator.
- To determine the math operations for expressions, look for these key words or phrases:

Operation	Addition	Subtraction	Multiplication	Division
Key Words and Phrases	added to plus sum of more than increased by total of and	subtracted from minus difference of less than decreased by fewer than take away	multiplied by times product of twice of	divided by quotient of

Key Ideas

Commutative Properties

- Changing the order of addends or factors does not change the sum or product.
- $a + b = b + a$
  $a \cdot b = b \cdot a$

Associative Properties

- Changing the grouping of addends or factors does not change the sum or product.
- $(a + b) + c = a + (b + c)$
  $(a \cdot b) \cdot c = a \cdot (b \cdot c)$

Multiplication Properties of Zero and One

- The product of any number and 0 is 0.
- The product of any number and 1 is that number.
- $a \cdot 0 = 0$
  $a \cdot 1 = a$

Addition Property of Zero

- The sum of any number and 0 is that number.
- $a + 0 = a$

Distributive Property

- To multiply a sum or difference by a number, multiply each number in the sum or difference by the number outside the parentheses. Then evaluate.
- $a(b + c) = ab + ac$
  $a(b - c) = ab - ac$

Factoring an Expression

- You can use the Distributive Property to factor expressions.
- $ab + ac = a(b + c)$
  $ab - ac = a(b - c)$

What's the Point?

The ability to use algebraic expressions and properties is very useful in real life for events like buying uniforms for a sports team. Have your student research how much it would cost to buy hats, socks, pants, and shirts for their school's softball team. What is the total cost for uniforms for all of the players on the team? Is there more than one way to set up the expression(s)?

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 3: Shadow Drawings STEM Video is available online at www.bigideasmath.com.

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Parent Newsletter

Chapter 4: Areas of Polygons

Standards

California Common Core:

6.G.1: Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

6.G.3: 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. Apply these techniques in the context of solving real-world and mathematical problems.

Students will...

Find areas of parallelograms.

Find areas of triangles.

Find areas of trapezoids.

Find areas of composite figures.

Draw polygons in the coordinate plane.

Find distances in the coordinate plane.

Solve real-life problems.

Key Terms

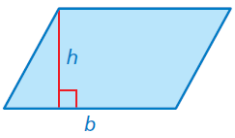
A ***polygon*** is a closed figure in a plane that is made up of three or more line segments that intersect only at their endpoints.

A ***composite figure*** is made up of triangles, squares, rectangles, and other two-dimensional figures.

Key Ideas

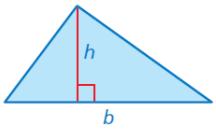
Area of a Parallelogram

- The area A of a parallelogram is the product of its base b and its height h.
- $A = bh$



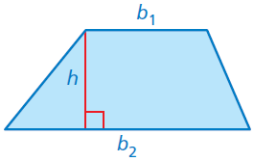
Area of a Triangle

- The area A of a triangle is one-half the product of its base b and its height h.
- $A = \frac{1}{2}bh$



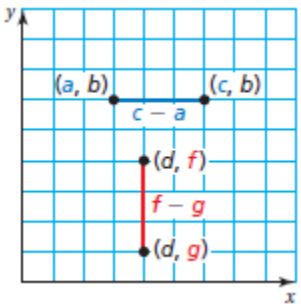
Area of a Trapezoid

- The area A of a trapezoid is one-half the product of its height h and the sum of its bases b_1 and b_2.
- $A = \frac{1}{2}h(b_1 + b_2)$



Finding Distances in the First Quadrant

- You can find the length of a horizontal or vertical line segment in a coordinate plane by using the coordinates of the endpoints.
  - When the x-coordinates are the same, the vertical distance between the points is the difference of the y-coordinates.
  - When the y-coordinates are the same, the horizontal distance between the points is the difference of the x-coordinates.
- Be sure to subtract the lesser coordinate from the greater coordinate.



Reference Tools

A **Four Square** can be used to organize information about a topic. Write the topic in the middle of the four square. Then write concepts related to the topic in the four squares surrounding the topic. Any concept related to the topic can be used. Encourage your student to include concepts that will help them learn the topic. They can place their four squares on note cards to use as a quick study reference.

Area of a parallelogram

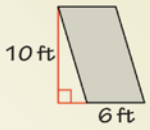
Words
The area A of a parallelogram is the product of its base b and its height h.

Algebra
$A = bh$

Example
$A = bh$
$= 8(5)$
$= 40$

The area of the parallelogram is 40 square inches.

Example
$A = bh$
$= 6(10)$
$= 60$



The area of the parallelogram is 60 square feet.

Quick Review

- The *height* of a parallelogram is the perpendicular distance from a base to the opposite side.
- The height of a parallelogram is NOT a side of the parallelogram, unless the figure is a rectangle or square.
- The *base* of a triangle can be any of its sides and the *height* of a triangle is the perpendicular distance from the base to the opposite vertex.
- The *height* of a trapezoid is the perpendicular distance between the parallel bases.

Games

- Math Card War
- Pick Your Polygon

These are available online in the *Game Closet* at www.bigideasmath.com.

Essential Questions

How can you derive a formula for the area of a parallelogram?

How can you derive a formula for the area of a triangle?

How can you derive a formula for the area of a trapezoid?

How can you find the lengths of line segments in a coordinate plane?

What's the Point?

The ability to find areas of polygons is very useful in real life for events like carpeting a room or finding the amount of material needed to build a bookshelf. Have your student figure out how many square feet of carpet they would need to buy to carpet their room.

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 4: Golf Course Maintenance STEM Video is available online at www.bigideasmath.com.

Big Ideas Math: California Course 1

Parent Newsletter

Chapter 5: Ratios and Rates

Standards

California Common Core:

6.RP.1: Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

6.RP.2: Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.

6.RP.3: 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.

Students will...

Understand the concept of a ratio.

Use ratios to describe the relationship between two quantities.

Use ratio tables to find equivalent ratios.

Understand the concepts of rates and unit rates.

Write unit rates.

Compare ratios.

Compare unit rates.

Graph ordered pairs to compare ratios and rates.

Write percents as fractions with denominators of 100.

Write fractions as percents.

Find percents of numbers.

Find the whole given the part and the percent.

Use conversion factors (rates) to convert units of measurement.

Solve real-life problems.

Key Ideas

Ratio

- Ratios can be part-to-part, part-to-whole, or whole-to-part comparisons.
- The ratio of a to b can be written as $a : b$.

Rate and Unit Rate

- Rate: a units : b units
- Unit rate: $\frac{a}{b}$ units : 1 unit

Writing Percents as Fractions

- A percent can be written as a fraction with a denominator of 100.
- $n\% = \frac{n}{100}$

Writing Fractions as Percents

- Write an equivalent fraction with a denominator of 100. Then write the numerator with the percent symbol.

Finding the Percent of a Number

- Write the percent as a fraction. Then multiply by the whole.
- The percent times the whole equals the part.

Finding the Whole

- Write the percent as a fraction. Then divide the part by the fraction.
- The part divided by the percent equals the whole.

Key Terms

A ***ratio*** is a comparison of two quantities.

Two ratios that describe the same relationship are ***equivalent ratios***.

A table used to find and organize equivalent ratios is called a ***ratio table***.

A ***rate*** is a ratio of two quantities using different units.

A ***unit rate*** compares a quantity to one unit of another quantity.

Equivalent rates have the same unit rate.

A ***percent*** is a part-to-whole ratio where the whole is 100.

The ***U.S. customary system*** is a system of measurement that contains units for length, capacity, and weight.

The ***metric system*** is a decimal system of measurement, based on powers of 10, that contains units for length, capacity, and mass.

A ***conversion factor*** is a rate that equals 1.

Unit analysis is a process used to decide which conversion factor will produce the appropriate units.

Reference Tools

Ratio: a comparison of two quantities. Ratios can be part-to-part, part-to-whole, or whole-to-part comparisons.

Example: 4 to 5

Example: 2 : 5

Example: teachers : students

A **Definition and Example Chart** can be used to organize information about a concept. Fill in the top rectangle with a term and its definition or description. Fill in the rectangles that follow with examples to illustrate the term. Each sample answer shows 3 examples, but your student can show more or fewer examples. Definition and example charts are useful for concepts that can be illustrated with more than one type of example.

Games

- I Have…, Who Has…?
- Match Them Up
- Order Matters
- How Close Can You Get?
- It's National Metric Week

These are available online in the *Game Closet* at www.bigideasmath.com.

Essential Questions

How can you represent a relationship between two quantities?

How can you find two ratios that describe the same relationship?

How can you use rates to describe changes in real-life problems?

How can you compare two ratios?

What is the connection between ratios, fractions, and percents?

How can you use mental math to find the percent of a number?

How can you compare lengths between the customary and metric systems?

Quick Review

- When writing rates it is very important to write the related units. The units tell the context for the rate.
- Ratios should be written as a to b or $a : b$.
- When a ratio is a part-to-whole comparison, it is equivalent to the fractional representation.
- 60% = 60 out of 100 = $\frac{60}{100}$ (part / per / one hundred (whole))
- Equivalent fractions are fractions that represent the same amount. For example, $\frac{2}{5}$ and $\frac{4}{10}$ are equivalent fractions.
- U.S. Customary to Metric Conversions

1 inch = 2.54 centimeters	1 foot ≈ 0.3 meter
1 mile ≈ 1.61 kilometers	1 quart ≈ 0.95 liter
1 gallon ≈ 3.79 liters	1 cup ≈ 237 milliliters
1 pound ≈ 0.45 kilogram	1 ounce ≈ 28.3 grams
1 gallon ≈ 3785 cubic centimeters	

*More conversions are available on page B1 of the textbook.

What's the Point?

The ability to use ratios and rates is very useful in real life for events like cooking with recipes. Have your student figure out how to make a dinner for 6 people based on a recipe that serves 4 people. How much of each ingredient will he or she need?

The STEM Videos available online show ways to use mathematics in real-life situations.
The Chapter 5: Human Circulatory System STEM Video is available online at www.bigideasmath.com.

Big Ideas Math: California Course 1

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Chapter 6: Integers and the Coordinate Plane

Standards

California Common Core:

6.NS.5: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6.NS.6: Understand a rational number as a point on the number line. 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.

6.NS.7: Understand ordering and absolute value of rational numbers.

6.NS.8: Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Key Terms

Positive numbers are greater than 0.

Negative numbers are less than 0.

Two numbers that are the same distance from 0 on a number line, but on opposite sides of 0, are called ***opposites***.

Integers are the set of whole numbers and their opposites.

The ***absolute value*** of a number is the distance between the number and 0 on a number line.

Students will...

Understand positive and negative integers and use them to describe real-life situations.

Graph integers on a number line.

Use a number line to compare positive and negative integers.

Use a number line to order positive and negative integers for real-life situations.

Understand positive and negative numbers and use them to describe real-life situations.

Graph numbers on a number line.

Find the absolute value of numbers.

Use absolute value to compare numbers in real-life situations.

Describe the locations of points in the coordinate plane.

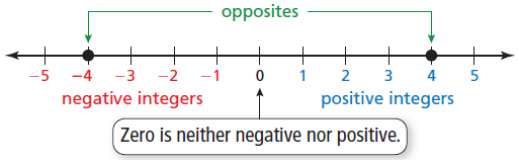
Plot points in the coordinate plane given ordered pairs.

Find distances between points in the coordinate plane.

Understand reflections of points in the coordinate plane.

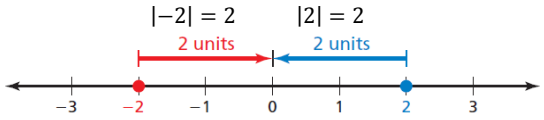
Key Ideas

Integers



Absolute Value

The absolute value of a number a is written as $|a|$.



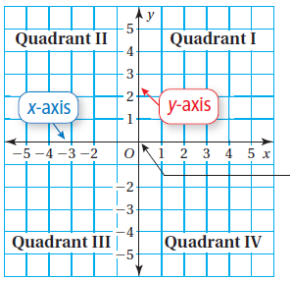
The Coordinate Plane

A **coordinate plane** is formed by the intersection of a horizontal number line and a vertical number line. The number lines intersect at the **origin** and separate the coordinate plane into four regions called **quadrants**.

An *ordered pair* is used to locate a point in a coordinate plane.

ordered pair: (4, −2)

x-coordinate, y-coordinate

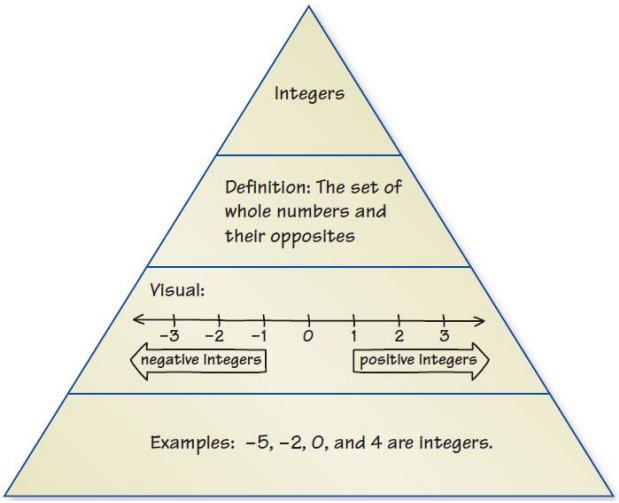


Reflecting a Point in the Coordinate Plane

- To reflect a point in the x-axis, use the same x-coordinate and take the opposite of the y-coordinate.
- To reflect a point in the y-axis, use the same y-coordinate and take the opposite of the x-coordinate.

Reference Tools

A **Summary Triangle** can be used to explain a concept. Typically, the summary triangle is divided into 3 or 4 parts. In the top part, write the concept being explained. In the middle part(s), write any procedure, explanation, description, definition, theorem, and/or formula(s). In the bottom part, write an example to illustrate the concept. Place summary triangles on note cards to use as a quick study reference.



Quick Review

- It is easier to compare numbers if they are both in the same form.
- There are three sets of numbers: positive integers, negative integers, and 0. Zero is neither positive nor negative.
- On a horizontal number line, numbers to the left are less than numbers to the right. Numbers to the right are greater than numbers to the left.
- On a vertical number line, numbers below are less than numbers above. Numbers above are greater than numbers below.
- If two numbers A and B are positive and $A < B$, then $-B < -A$.
- The absolute value of a number is the *distance* from 0. Distance is a positive number or 0.
- The order in which you plot points on the coordinate plane is important.
  - The x-coordinate is always first. It tells us how far to go horizontally, and in which direction.
  - The y-coordinate is always second. It tells us how far to go vertically, and in which direction.

Essential Questions

How can you represent numbers that are less than 0?

How can you use a number line to order real-life events?

How can you use a number line to compare positive and negative fractions and decimals?

How can you describe how far an object is from sea level?

How can you graph and locate points that contain negative numbers in a coordinate plane?

Games

- What Does It Say?
- Six in a Row

These are available online in the *Game Closet* at www.bigideasmath.com.

What's the Point?

The ability to use integers and the coordinate plane is very useful in real life for events like showing trends in the stock market. Ask your student to research the closing price for a company's stock everyday for a week. Then have them graph the results in a line graph and interpret the results. Would they invest in that company? Why or why not?

The STEM Videos available online show ways to use mathematics in real-life situations.
The Chapter 6: Tuning a Guitar STEM Video is available online at www.bigideasmath.com.

Big Ideas Math: California Course 1

Parent Newsletter

Chapter 7: Equations and Inequalities

Students will...

Write word sentences as equations.

Use addition or subtraction to solve equations.

Use substitution to check answers.

Use multiplication or division to solve equations.

Use substitution to check answers.

Identify independent and dependent variables.

Write equations in two variables.

Use tables and graphs to analyze the relationship between two variables.

Write word sentences as inequalities.

Use a number line to graph the solution set of inequalities.

Use inequalities to represent real-life situations.

Use addition or subtraction to solve inequalities.

Use a number line to graph the solution set of inequalities.

Use multiplication or division to solve inequalities.

Use a number line to graph the solution set of inequalities.

Solve real-life problems.

Key Terms

An ***equation*** is a mathematical sentence that uses an equal sign, =, to show that two expressions are equal.

A ***solution*** of an equation is a value that makes the equation true.

Inverse operations "undo" each other, such as addition and subtraction or multiplication and division.

An ***equation in two variables*** represents two quantities that change in relationship to one another.

A ***solution of an equation in two variables*** is an ordered pair that makes the equation true.

The variable representing the quantity that can change freely in an equation in two variables is the ***independent variable***.

The variable whose value depends on the independent variable in an equation in two variables is the ***dependent variable.***

An ***inequality*** is a mathematical sentence that compares expressions.

A ***solution of an inequality*** is a value that makes the inequality true.

The set of all solutions of an inequality is called the ***solution set***.

The ***graph of an inequality*** shows all the solutions of the inequality on a number line.

Standards

California Common Core:

6.EE.5: 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? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

6.EE.6: Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

6.EE.7: 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 nonnegative rational numbers.

6.EE.8: Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x <$ c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

6.EE.9: Use variables to represent two quantities in a real-world problem that change in relationship to one another; 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. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Key Ideas

Addition Property of Equality
When you add the same number to each side of an equation, the two sides remain equal.

Subtraction Property of Equality
When you subtract the same number from each side of an equation, the two sides remain equal.

Multiplication Property of Equality
When you multiply each side of an equation by the same nonzero number, the two sides remain equal.

Multiplicative Inverse Property
The product of a nonzero number n and its reciprocal, $\frac{1}{n}$, is 1.

Division Property of Equality
When you divide each side of an equation by the same nonzero number, the two sides remain equal.

Distance Formula
To find the distance traveled d, multiply the speed r by the time t.

$$d = rt$$

Reference Tools

An **Example and Non-Example Chart** can be used to list examples and non-examples of a vocabulary word or term. Write examples of the word or term in the left column and non-examples in the right column. This type of organizer serves as a good tool for assessing knowledge of pairs of topics that have subtle but important differences, such as equations and inequalities.

Equations

Examples	Non-Examples
$x = 5$	5
$2a = 16$	$2a$
$x + 4 = 19$	$x + 4$
$5 = x + 3$	$x + 3$
$12 - 7 = 5$	$12 - 7$
$\frac{3}{4}y = 6$	$\frac{3}{4}$

Essential Questions

How does rewriting a word problem help you solve the word problem?

How can you use addition or subtraction to solve an equation?

How can you use multiplication or division to solve an equation?

How can you write an equation in two variables?

How can you use a number line to represent solutions of an inequality?

How can you use addition or subtraction to solve an inequality?

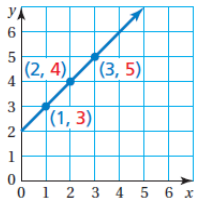
How can you use multiplication or division to solve an inequality?

Key Ideas

Tables, Graphs, and Equations

You can use tables and graphs to represent equations in two variables. The table and graph below represent the equation $y = x + 2$.

Independent Variable, x	Dependent Variable, y	Ordered Pair, (x, y)
1	3	(1, 3)
2	4	(2, 4)
3	5	(3, 5)



Addition Property of Inequality

When you add the same number to each side of an inequality, the inequality remains true.

Subtraction Property of Inequality

When you subtract the same number from each side of an inequality, the inequality remains true.

Multiplication Property of Inequality

When you multiply each side of an inequality by the same *positive* number, the inequality remains true.

Division Property of Inequality

When you divide each side of an inequality by the same *positive* number, the inequality remains true.

Games

- Tic-Tac-Toe

This is available online in the *Game Closet* at www.bigideasmath.com.

What's the Point?

The ability to write and solve equations and inequalities is very useful in real life for events like making a household budget. Ask your student how they plan on spending their money next month. Then have them make a budget to show at least how much money they will need to earn to cover all the costs.

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 7: Designing a CubeSat STEM Video is available online at www.bigideasmath.com.

Quick Review

- When graphing an inequality on a number line, an open circle (○) is used when a number is *not* a solution. A closed circle (●) is used when a number is a solution. An arrow to the left or right shows that the graph continues in that direction.
- Subtraction is not commutative so the order in which the terms are written does matter. *A number decreased by 4* is different from *4 decreased by a number*.
- Addition and subtraction and multiplication and division are inverse operations. The inverse operation must be done on both sides of the equation so that the two sides remain equal.

Inequality Symbols				
Symbol	$<$	$>$	$\leq$	$\geq$
Key Phrases	• is less than • is fewer than	• is greater than • is more than	• is less than or equal to • is at most • is no more than	• is greater than or equal to • is at least • is no less than

Big Ideas Math: California Course 1

Parent Newsletter

Chapter 8: Surface Area and Volume

Students will...

Draw three dimensional figures.

Find the number of faces, edges, and vertices of solids.

Use nets to represent prisms.

Find the surface area of prisms.

Use nets to represent pyramids.

Find the surface area of pyramids.

Find the volume of prisms with fractional edge lengths by using models.

Find the volume of prisms by using formulas.

Solve real-life problems.

Standards

California Common Core:

6.G.2: 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 $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.4: Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Key Terms

A ***solid*** is a three-dimensional figure that encloses a space.

A ***polyhedron*** is a solid whose *faces* are all polygons.

A flat surface of a polyhedron is called a ***face***.

A line segment where two faces intersect is called an ***edge***.

A point where three or more edges intersect is called a ***vertex*** of a solid.

The ***surface area*** of a solid is the sum of the areas of all of its faces.

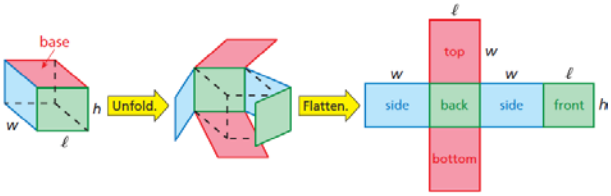
A two-dimensional representation of a solid is called a ***net***.

The ***volume*** of a three dimensional figure is a measure of the amount of space that it occupies.

Key Ideas

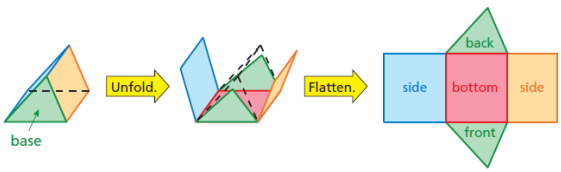
Net of a Rectangular Prism

A *rectangular prism* is a prism with rectangular bases.



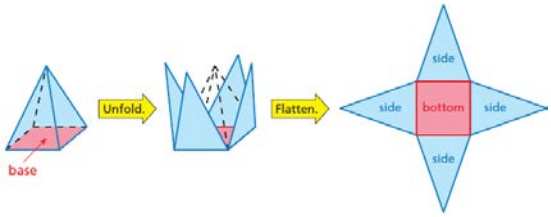
Net of a Triangular Prism

A *triangular prism* is a prism with triangular bases.



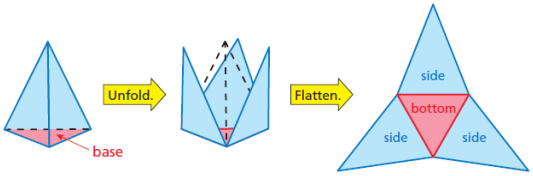
Net of a Square Pyramid

A *square pyramid* is a pyramid with a square base.

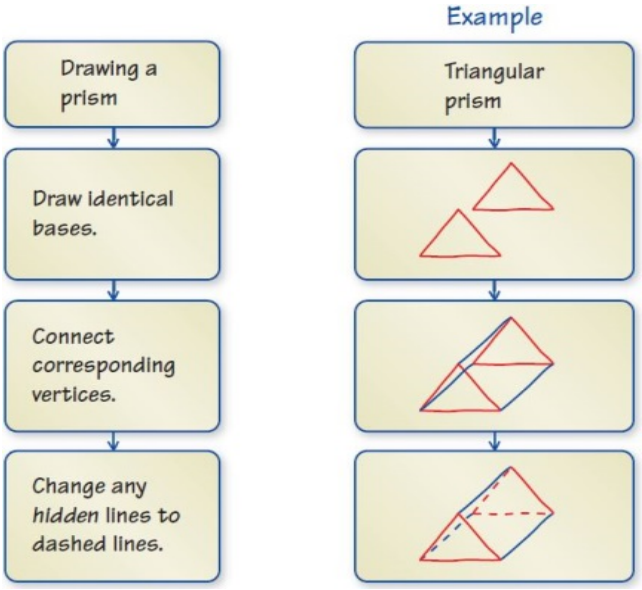


Net of a Triangular Pyramid

A *triangular pyramid* is a pyramid with a triangular base.



Reference Tools



A **Process Diagram** can be used to show the steps involved in a procedure. Process diagrams are particularly useful for illustrating procedures with two or more steps, and they can have one or more branches. As shown, process diagrams can have two parallel parts, in which the procedure is stepped out in one part and an example illustrating each step is shown in the other part. Or, the diagram can be made up of just one part, with example(s) included in the last "bubble" to illustrate the steps that precede it.

Essential Questions

How can you draw three-dimensional figures?

How can you find the area of the entire surface of a prism?

How can you use a net to find the surface area of a pyramid?

How can you find the volume of a rectangular prism with fractional edge lengths?

Quick Review

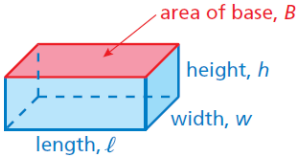
- Area is always measured in square units, and volume is always measured in cubic units.
- Square units are used to label surface area.
- It is traditional to consider the *top and bottom* faces of a rectangular prism as the bases.
- A pyramid with a regular base has congruent lateral faces.
- When asked to find the surface area of a prism or pyramid, the base is included.

Key Ideas

Volume of a Rectangular Prism

The volume V of a rectangular prism is the product of the area of the base and the height of the prism.

$V = Bh$ or $V = \ell wh$

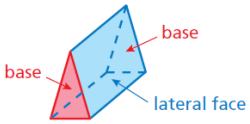


Prisms

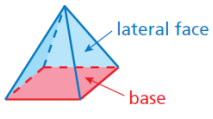
A prism is a polyhedron that has two parallel, identical *bases*. The *lateral faces* are parallelograms.

Pyramids

A pyramid is a polyhedron that has one base. The lateral faces are triangles.



Triangular Prism



Rectangular Pyramid

The shape of the base tells the name of the prism or the pyramid.

What's the Point?

The ability to find surface area and volume is very useful in real life for situations like packaging materials. Ask your student to find the amount of cereal that can fit in two different boxes. Then ask them to find the surface area of the boxes. Which box can hold more cereal? Why do they think the cereal company uses the dimensions that they do?

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 8: Packaging Design STEM Video is available online at www.bigideasmath.com.

Big Ideas Math: California Course 1

Parent Newsletter

Chapter 9: Statistical Measures

Standards

California Common Core:

6.SP.1: Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

6.SP.2: Understand 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.

6.SP.3: 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.

6.SP.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.5a: Summarize numerical data sets in relation to their context by reporting the number of observations.

6.SP.5c: Summarize numerical data sets in relation to their context by giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

Students will...

Recognize statistical questions.

Use dot plots to display numerical data.

Understand the concept of the mean of data sets.

Find the mean of data sets.

Compare and interpret the means of data sets.

Understand the concept of measures of center.

Find the median and mode of data sets.

Find the range of data sets.

Find the interquartile range of data sets.

Check for outliers in data sets.

Understand the meaning of *mean absolute deviation*.

Find the mean absolute deviation of data sets.

Key Terms

Statistics is the science of collecting, organizing, analyzing, and interpreting data.

A ***statistical question*** is one for which you do not expect to get a single answer.

An ***outlier*** is a data value that is much greater or much less than the other values.

A ***measure of center*** is a measure that describes the typical value of a data set.

A ***measure of variation*** is a measure that describes the distribution of a data set.

The ***range*** of a data set is the difference between the greatest value and the least value.

The ***mean absolute deviation*** is an average of how much data values differ from the mean.

Key Ideas

Mean

- The **mean** of a data set is the sum of the data divided by the number of data values.

Median

- Order the data. For a set with an odd number of values, the **median** is the middle value.
- For a set with an even number of values, the median is the mean of the two middle values.

Mode

- The **mode** of a data set is the value or values that occur most often. Data can have one mode, more than one mode, or no mode. When all values occur only once, there is no mode.

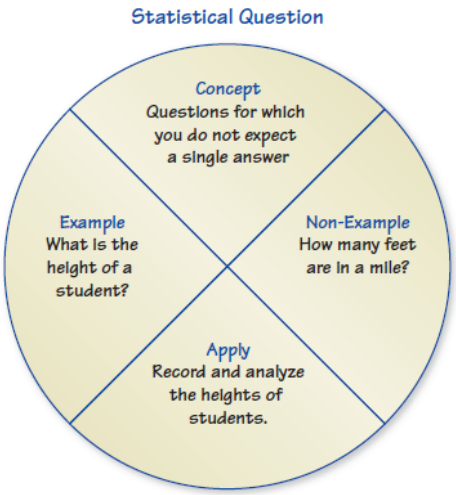
Games

- M and M and M

This is available online in the *Game Closet* at www.bigideasmath.com.

Reference Tools

A **Concept Circle** can be used to organize information about a concept. Write the concept above the circle. Then write associated information in the sectors of the circle. Associated information can include (an explanation of the) Concept, Apply, Solve, Check, Example, Non-Example, Vocabulary, Property, Visual, Words, Algebra, and Justify. Concept circles can have more or fewer than four sectors. Place concept circles on note cards to use as a quick study reference.



Essential Questions

How can you tell whether a question is a statistical question?

How can you find an average value of a data set?

In what other ways can you describe an average of a data set?

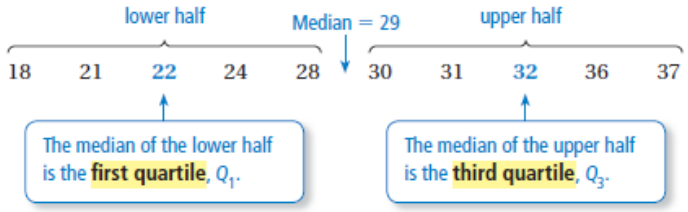
How can you describe the spread of a data set?

How can you use the distances between each data value and the mean of a data set to measure the spread of a data set?

Key Ideas

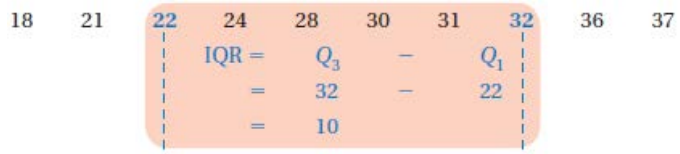
Quartiles

The **quartiles** of a data set divide the data into four equal parts. Recall that the median (second quartile) divides the data set into two halves.



Interquartile Range (IQR)

The difference between the third quartile and the first quartile is called the **interquartile range**. The IQR represents the range of the middle half of the data and is another measure of variation.



Finding the Mean Absolute Deviation (MAD)

Step 1: Find the mean of the data.
Step 2: Find the distance between each data value and the mean.
Step 3: Find the sum of the distances in Step 2.
Step 4: Divide the sum in Step 3 by the total number of data values.

What's the Point?

The ability to use statistical measures is very useful in real life for events like evaluating research data. Have your student survey their family or class about something that interests them. Then have them find the measures of variation. Are there any outliers (extreme values in the data)? If so, what affect does this value have on the mean, median, and mode? What do these values tell you about the data?

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 9: Daylight in the Big City STEM Video is available online at www.bigideasmath.com.

Quick Review

- A dot plot uses a number line to show the number of times each value in a data set occurs. Dot plots show the *spread* and the *distribution* of a data set.
- An outlier that is very low or high compared to the rest of the data values will cause the mean to be too low or high. By eliminating the outlier, you can calculate a mean that better demonstrates the average of the data.
- The first quartile can also be called the *lower quartile*. The third quartile can also be called the *upper quartile*.
- The greater the mean absolute deviation, the greater the variation of the data.

Big Ideas Math: California Course 1

Parent Newsletter

Chapter 10: Data Displays

Standards

California Common Core:

6.SP.2: Understand 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.

6.SP.4: Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.5c: Summarize numerical data sets in relation to their context by giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

6.SP.5d: 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 were gathered.

Essential Questions

How can you use place values to represent data graphically?

How can you use intervals, tables, and graphs to organize data?

How can you describe the shape of the distribution of a data set?

How can you use quartiles to represent data graphically?

Students will...

Make and interpret stem-and-leaf plots.

Make histograms.

Use histograms to analyze data.

Describe shapes of distributions.

Choose appropriate measures of center and variation to represent data sets.

Make and interpret box-and-whisker plots.

Compare box-and-whisker plots.

Key Ideas

Stem-and-Leaf Plots

- A **stem-and-leaf plot** uses the digits of data values to organize a data set.
- Each data value is broken into a **stem** (digit or digits on the left) and a **leaf** (digit or digits on the right).
- A stem-and-leaf plot shows how data are distributed.

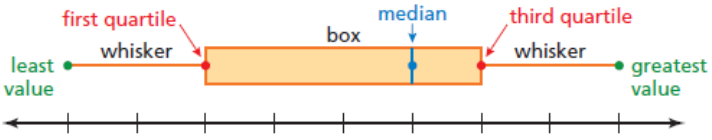
Stem	Leaf
2	0 0 1 2 5 7
3	1 4 8
4	2
5	8 9

Key: 2|0 = 20

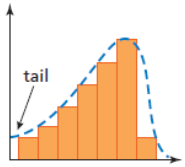
The *key* explains what the stems and leaves represent.

Box-and-Whisker Plot

- A **box-and-whisker plot** represents a data set along a number line by using the least value, the greatest value, and the quartiles of the data.
- A box-and-whisker plot shows the *variability* of a data set.
- The five numbers that make up the box-and-whisker plot are called the **five-number summary** of the data set.

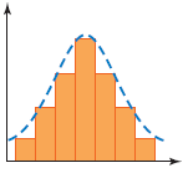


Symmetric and Skewed Distributions



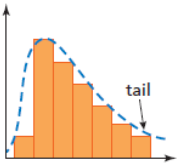
Skewed left

- The "tail" of the graph extends to the left.
- Most data are on the right.



Symmetric

- The left side of the graph is a mirror image of the right side of the graph.



Skewed right

- The "tail" of the graph extends to the right.
- Most data are on the left.

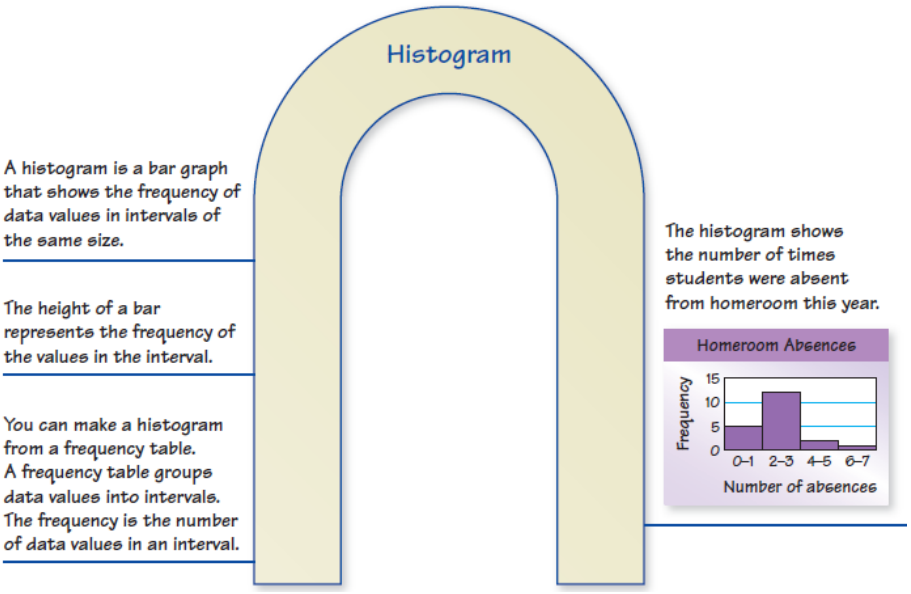
Key Terms

A ***frequency table*** is a table used to group data values into intervals.

The number of data values in an interval is called the ***frequency***.

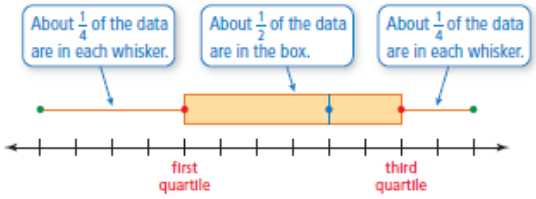
Reference Tools

A **Word Magnet** can be used to organize information associated with a vocabulary word or term. As shown, write the word or term inside the magnet. Write associated information on the blank lines that "radiate" from the magnet. Associated information can include, but is not limited to: other vocabulary words or terms, definitions, formulas, procedures, examples, and visuals. This type of organizer serves as a good summary tool because any information related to a topic can be included.



Quick Review

- A stem-and-leaf plot is very similar to a dot plot, but the stem-and-leaf plot gives additional information. The stem-and-leaf plot uses the ones digit of the data values instead of dots, so you can see the distribution within each group of ten.
- If you can draw a line through the median of a box-and-whisker plot, and each side is a mirror image of the other, then the distribution is symmetric.
- You can use a measure of center and a measure of variation to describe the distribution of a data set. The shape of the distribution can help you choose which measures are the most appropriate to use.
- The figure shows how data are distributed in a box-and-whisker plot.



Key Ideas

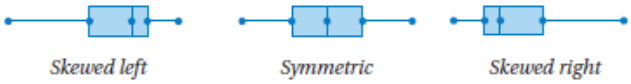
Histograms

- A **histogram** is a bar graph that shows the frequency of data values in intervals of the same size. The height of a bar represents the frequency of the values in the interval.

Choosing Appropriate Measures

- The mean absolute deviation (MAD) uses the mean in its calculation.
- When a data distribution is *symmetric*,
  - use the mean to describe the center and
  - use the MAD to describe the variation.
- The interquartile range (IQR) uses quartiles in its calculation.
- When a data distribution is *skewed*,
  - use the median to describe the center and
  - use the IQR to describe the variation.

Shapes of Box-and-Whisker Plots



Skewed left

- Left whisker longer than right whisker
- Most data on the right

Symmetric

- Whiskers about same length
- Median in the middle of the box

Skewed right

- Right whisker longer than left whisker
- Most data on the left

What's the Point?

The ability to use data displays is very useful in real life for events like organizing and presenting research. Ask your student to conduct an experiment that interests them. It could be anything from surveying their family or class to weighing fruit at the grocery store. Have them display the data multiple ways. What kind of data display fits the data best? Why?

The STEM Videos available online show ways to use mathematics in real-life situations. The Chapter 10: Choosing a Dog STEM Video is available online at www.bigideasmath.com.