SOARING HEIGHTS
CHARTER SCHOOL
DEVELOPING CHARACTER • BUILDING COMMUNITY • GROWING LEADERS

**7th Grade Math Curriculum** **Revised August 2024**

## Chapter 1 - Adding and Subtracting Rational Numbers

### Standards

**7.NS.A.1 -** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

**7.NS.A.1a -** Describe situations in which opposite quantities combine to make 0. For example, in the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?

**7.NS.A.1b -** Understand as the number located a distance from , in the positive or negative direction depending on whether $q$ is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

**7.NS.A.1c -** Understand subtraction of rational numbers as adding the additive inverse, . 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.

**7.NS.A.1d -** Apply properties of operations as strategies to add and subtract rational numbers.

**7.NS.A.3 -** Solve real-world and mathematical problems involving the four operations with rational numbers. (Clarification: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)

**MP.1:** Make sense of problems and persevere in solving them

**MP.2:** Reason abstractly and quantitatively

**MP.3:** Construct viable arguments and critique the reasoning of others

**MP.4:** Model with mathematics

**MP.5:** Use appropriate tools strategically

**MP.6:** Attend to precision

**MP.7:** Look for and make use of structure

**MP.8:** Look for and express regularity in repeated reasoning

**Objective:**

- Understand absolute values and ordering of rational numbers.
- Find sums of integers.
- Find sums of rational numbers.
- Find differences of integers.
- Find differences of rational numbers and find distances between numbers on a number line.
- Add and subtract integers and rational numbers.

  Apply properties of operations as strategies to perform operations with rational numbers.
- Solve problems involving the four operations with rational numbers.

**Activities**

1. Have students work in small groups and think of patterns in real-life situations. Then they can search together for mathematical patterns that allow them to form rules for multiplying integers. Allow groups to share their findings.

2. Have students work in small groups. Have each group make up a computation problem using 3 numbers, 2 operation signs, and 1 set of parentheses, such as 12-(2+7). Have them write each number and each symbol on separate cards (7 cards total). Have them write the word "Answer = on an eighth card, filing in the computed answer to the problem (in this case, 3). Have groups shuffle their cards and exchange cards with another group. See which group can put the cards in order the fastest.

**Gifted and Talented Activities:**

1. Have pairs of students make posters demonstrating how to write a large number in scientific notation. They should show how to move the decimal point to the left (so that the number is greater than or equal to 1 but less than 10) and how to count the places that the decimal was moved to find the exponent. Posters can be displayed in the classroom as reminders of the process.

2. Plot (5,2) and (-5, 2) on a coordinate grid. Explain that if you fold the grid on the y-axis, the two points would coincide, that one point is a reflection of the other

point, and that the reflection line is the y-axis. Have students graph the triangle with vertices (2,3), (5,0), (5,5) and determine how to change the coordinates, so the resulting triangle is a flip over the x-axis. ( (2,-3), (5,0), (5,-5); keep the x-coordinates unchanged and take the opposite of the y-coordinates.

## Chapter 2 - Multiplying and Dividing Rational Numbers

**Standards** -

**7.NS.A.2 -** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

**7.NS.A.2a -** 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  and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

**7.NS.A.2b -** 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  and  are integers, then  . Interpret quotients of rational numbers by describing real world contexts.

**7.NS.A.2c -** Apply properties of operations as strategies to multiply and divide rational numbers.

**7.NS.A.2d -** 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.

**7.NS.A.3 -** Solve real-world and mathematical problems involving the four operations with rational numbers. (Clarification: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.)

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**Objectives:**

- Find products of integers.
- Find quotients of integers.
- Convert between different forms of rational numbers.
- Find products of rational numbers.
- Find quotients of rational numbers.
- Apply properties of operations as strategies to perform operations with rational numbers.
- Solve problems involving the four operations with rational numbers.

**Activities:**

1. Have students work in small groups and think of patterns in real-life situations. Then they can search together for mathematical patterns that allow them to form rules for multiplying integers. Allow groups to share their findings.
2. Have students work in small groups. Have each group make up a computation problem using 3 numbers, 2 operation signs, and 1 set of parentheses, such as 12-(2+7). Have them write each number and each symbol on separate cards (7 cards total). Have them write the word "Answer = on an eighth card, filing in the computed answer to the problem (in this case, 3). Have groups shuffle their cards and exchange cards with another group. See which group can put the cards in order the fastest.

**Gifted and Talented Activities:**

1. Have pairs of students make posters demonstrating how to write a large number in scientific notation. They should show how to move the decimal point to the left (so that the number is greater than or equal to 1 but less than 10) and how to count the places that the decimal was moved to find the exponent. Posters can be displayed in the classroom as reminders of the process.

2. Plot (5,2) and (-5, 2) on a coordinate grid. Explain that if you f ld the grid on the y-axis, the two points would coincide, that one point is a reflection of the other point, and that the reflection line is the y-axis. Have students graph the triangle with vertices (2,3), (5,0), (5,5) and determine how to change the coordinates, so the resulting triangle is a flip over the x-axis. ( (2,-3), (5,0), (5,-5); keep the x-coordinates unchanged and take the opposite of the y-coordinates.

**Chapter 3 - Expressions 7.EE.A.1, A.2, MP. 1, MP.2, MP. 3, MP.4, MP.5, MP.6, MP.7, MP. 8**

**Standards** -

**7.EE.A.1 -** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

**7.EE.A.2 -** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."

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**Objectives**:

- Simplify algebraic expressions.
- Find sums and differences of linear expressions.
- Apply the Distributive Property to generate equivalent expressions.
- Factor algebraic expressions.
- Add, subtract, factor and expand linear expressions with rational coefficients.
- Understand that rewriting expressions in different forms can show how the quantities are related.

**Activities:**

1. Have students work in small groups and think of patterns in real-life situations. Then they can search together for mathematical patterns that allow them to form rules for multiplying integers. Allow groups to share their findings.

2. Have students work in small groups. Have each group make up a computation problem using 3 numbers, 2 operation signs, and 1 set of parentheses, such as

12-(2+7). Have them write each number and each symbol on separate cards (7 cards total). Have them write the word "Answer = on an eighth card, filing in the computed answer to the problem (in this case, 3). Have groups shuffle their cards and exchange cards with another group. See which group can put the cards in order the fastest.

**Gifted and Talented Activities:**

1. Have pairs of students make posters demonstrating how to write a large number in scientific notation. They should show how to move the decimal point to the left (so that the number is greater than or equal to 1 but less than 10) and how to count the places that the decimal was moved to find the exponent. Posters can be displayed in the classroom as reminders of the process.
2. Plot (5,2) and (-5, 2) on a coordinate grid. Explain that if you fold the grid on the y-axis, the two points would coincide, that one point is a reflection of the other point, and that the reflection line is the y-axis. Have students graph the triangle with vertices (2,3), (5,0), (5,5) and determine how to change the coordinates, so the resulting triangle is a flip over the x-axis. ( (2,-3), (5,0), (5,-5); keep the x-coordinates unchanged and take the opposite of the y-coordinates.

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## Chapter 4 - Equations and Inequalities

**Standards** -

**7.EE.B.4** - 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.

**7.EE.B.4a -** Solve word problems leading to equations of the form and , where , , and are specific rational numbers. Solve equations of these forms with accuracy and efficiency. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

**7.EE.B.4b -** Solve word problems leading to inequalities of the form or , where , , and are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.

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**Objectives:**

- Write and solve equations using addition or subtraction.
- Write and solve equations using multiplication or division.
- Write and solve two-step equations.
- Write inequalities and represent solutions of inequalities on number lines.
- Write and solve inequalities using multiplication or division.
- Write and solve two-step inequalities.
- Solve two-step equations.
- Compare algebraic solutions to arithmetic solutions.
- Solve two-step inequalities involving integers and rational numbers

**Activities:**

1. When 3 children go to a movie, the total cost (c) of buying an item for all 3 can be found by using the formula C-3*p, where p is the price of an individual item. The price of a candy bar is $2. Use 3 small containers to represent 3*p. Place 2 counters in each container. What is the cost of the 3 candy bars? ($6) To show the cost of three $5 movie tickets, place 5 counters in each of the 3 containers. Use the formula to find the cost of the movie tickets? ($15)

2. Have students play this game in pairs. Each student should make up an expression using at least three numbers from 1 through 10 and at least two different operations. The expression must represent a whole number. Parentheses and/or division bars may be used. Have partners exchange papers and find the value. The first student to find the correct value earns a point. Repeat the process 4 times, for a total of 5 rounds.

3. Use a concept map to solve equations (problem/operation with variable/ inverse/ what do I have to do to both sides to get the variable by itself (zero Pair).

**Gifted and Talented Activities**:

1. Millers Car Rental allows 200 free miles. The charges are $35.00 per day, plus $0.30 for every mile over 200. Write a formula to figure the amount charged (c) *for* driving a car m miles in d days. (C=35d+.30(m-200)

2. Ben wanted to buy a $10 tape, but he did not have that much money. He told Ken, "Lend me the same amount of money as I have, and I will buy the tape." Ken agreed, and Ben bought the tape. At a bookstore Ben made the same request, got the loan, and bought a $10 book. Now he has no money left. How much did he have before the loan for the tape? ($7.50)

3. There are 310 books on a shelf. There are twice as many math books as geography books and 10 more science books than math books. How many of each kind are on the shelf? (60 geography books, 120 math books, and 130 science books)

**Chapter 5 - Ratios andProportions**

**Standards** -

**7.RP.A.1 -** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks ½ mile in each ¼ hour, compute the unit rate as the complex fraction (½) / (¼) miles per hour, equivalently 2 miles per hour.

**7.RP.A.2 -** Recognize and represent proportional relationships between quantities.

**7.RP.A.2a -** Decide whether two quantities are in a proportional relationship, 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.

**7.RP.A.2b -** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

**7.RP.A.2c -** Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t=pn .

**7.RP.A.2d -** 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 where *r* is the unit rate.

**7.RP.A.3 -** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

**7.G.A.1 -** 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.

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**Objectives:**

- Understand ratios of rational numbers and use ratio tables to represent equivalent ratios.
- Understand rates involving fractions and use unit rates to solve problems.
- Determine whether two quantities are in a proportional relationship.
- Use proportions to solve ratio problems.
- Represent proportional relationships using graphs and equations.
- Solve problems involving scale drawings.
- Find unit rates associated with ratios of fractions, areas, and other quantities in like or different units.
- Decide whether two quantities are proportional using ratio tables and graphs.
- Identify the constant of proportionality in tables, graphs, equations, diagrams and verbal descriptions.
- Represent proportional relationships with equations.
- Explain what a point (x,y) means on a proportional graph in context, particularly (0,0) an (1,r) where r is the unit rate.
- Use proportionality to solve multistep ratio problems.
- Use scale drawings to compute actual lengths and areas and reproduce a scale drawing at a different scale.

**Activities:**

1. Tale a count of right- and left-handers on your class. Have students write the ratio of right-handers to left-handers, left-handers to right-handers, and right-and

left-handers to the entire class. They should notice that the first two ratios are reciprocals of each other, while the denominator of the last two is the sum of the two categories.

2. Play Money - quarters, dimes, nickels, pennies. Write equivalent ratios for these ratios comparing values. Then model the ratios with the play money. 2 dimes/4 nickels dime/2 nickels; 4 dimes/8 nickels 2 quarters/10 nickels 1 quarter/ 5 nickels 3 quarters/ 15 nickels

**Gifted and Talented Activities:**

1. Show students that they need not multiply or divide the terms of a ratio by a whole number to get an equivalent ratio. For the following pairs of ratios, have students explain how the second is obtained from the first. Then have them make up similar pairs.

8/10**=**20/25 5.6/10.4 3.5/6.5

2. Work with a group of three or four students. Demonstrate the correct way to fold a business letter into thirds. Have the students fold a business letter and pretend to stuff them into envelopes. Students then might write addresses on the outside of the papers. See how many "letters" they can have ready to mail in 15 seconds. Then, have students write and solve proportion to determine how long it would take to have 1 million letters ready for a mass mailing.

**Chapter 6 - Percents**

**7.NS.A.2,EE.A.2,EE.B.3,EE.B.4, EE.B.4a, MP. 1, MP.2, MP. 3, MP.4, MP.5, MP.6, MP.7, MP. 8**

**Standards** -

**7.RP.A.3 -** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
**7.EE.B.3 -** Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

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**Objectives**:

- Rewrite fractions, decimals and percents using different representations.
- Use the percent proportion to find missing quantities.
- Use the percent equation to find missing quantities.
- Find percents of change in quantities.
- Solve percent problems involving discounts and markups.
- Understand and apply the simple interest formula.
- Use proportionality to solve multi step percent problems.
- Solve percent problems involving percents of increase and decrease, and simple interest.
- Compare fractions, decimals and percents.

## Activities

1. Work with a partner. Write each fraction and each percent in the table on page 275 on an

index card. Shuffle the cards and give an equal number of cards to each person. Make as many pairs of equivalent fractions and percents as possible. The person with the most pairs wins.

2. Work with a partner. Pretend that you charged the total amount you bought at the 20% discounted prices. Then you forgot to pay the credit card bill for the month. If the interest rate on your credit card is 21% per year, what was the interest due on your purchases for the month (1/12 year)? Next, find what one month's interest would be on purchases of $1000. ($17.50)

**Gifted and Talented Activities:**

1. Suppose the price of a coat is discounted 20% and the sales tax rate is 5%. Would you prefer that the salesperson subtract the discount first and then figure the sales tax, or first add the sales tax and then subtract the discount? (Answer: It makes no difference, the final cost is the same: .80 X 1.05 1.05 X .80)

2. Challenge students with this problem: You have a choice of getting two successive raises in pay. One will be 10% and the other will be 15%. One raise will e six months after the other. In which order would you prefer to get the raises? (15% and the 10%. It's true that after six months the pay will be the same regardless in which order the raises are received, but for six months your pay would be higher with the 15% raise first.)



**Chapter 7 - Probability**

**Standards** -

**7.SP.C.5 -** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

**7.SP.C.6 -** 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 predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times**.**

**7.SP.C.7 -** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

**7.SP.C.7a -** Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.

**7.SP.C.7b -** Develop a probability model (which may not be uniform) by observing frequencies in data generated

from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?

**7.SP.C.8 -** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
**7.SP.C.8a -** 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.
**7.SP.C.8b -** Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
**7.SP.C.8c - D**esign and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?
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**Objectives:**

- Understand how the probability of an event indicates its likelihood.
- Develop probability modes using experimental and theoretical probability.
- Find sample spaces and probabilities of compound events.
- Design and use simulations to find probabilities of compound events.
- Understand that probability is the likelihood of an event occurring, expressed as a number from 0 to 1.
- Approximate the probability of a chance event and predict the approximate relative frequency given the probability.
- Develop probability models and use them to find probabilities.
- Find the probabilities of compound events.

**Activities:**

1. Have students use a concrete object, such as a sandwich -shop menu that offers the

customer a choice of various combinations, as an example of possible choices. Then have students display the choices in a tree diagram.

2. Work with a partner. Pretend that you are picking a group leader at random. Write five names on slips of paper and put them into a paper bag. Now use the bag to help you model the answer to these questions. What probability does each person have of becoming group leaders? (1/5) Assuming that a person cannot serve as group leader again, what chance does someone else have in a second random drawing? Third random drawing? Fourth random drawing? Fifth random drawing? (1/4, 1/3, 2, 1) Assuming that a person can serve again, what chance does someone else have in a second, third, fourth, and fifth drawing? (1/5, 1/5, 1/5, 1/5)

**Gifted and Talented Activities:**

1. Hermits 1, 2, 3, 4, 5, and 6 are the only occupants of an island. Today, Hermit 1 has an illness that can be passed on to anyone who is not immune. The illness lasts one day, after which the person is immune. Hermit 2-6 have never had the illness. Roll a number cube to simulate which person the sick hermit visits for help. (Ignore the sick hermit's number if it comes up.) The next day, the visited hermit will be ill and will visit someone for help. Roll the cube again to determine whom. Continue this experiment until a sick hermit visits an immune one and the illness dies out. Repeat the experiment 5 times, and find the average number of hermits who get the illness before it dies out.

2. Have students collect promotional contest or sweepstakes materials received in the mail or in the media. Have them work in groups to find and make a list of the odds of winning sweepstakes and other promotional contests. (This information is required to be presented with the contest literature.) Then students should research the probability of such things as a person: having a car accident, being struck by lightning, and being elected president. Students can present to the class the comparison of the probabilities of these

**Chapter 8 - Statistics**

**Standards** -

**7.SP.A.1 -** Understand that statistics can be used to gain information about a population by examining a sample of

the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

**7.SP.A.2 -** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.

**7.SP.B.3 -** 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. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

**7.SP.B.4 -** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.

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**Objectives**:

- Understand how to use random samples to make conclusions about a population.
- Understand variability in samples of a population.
- Compare populations using measures of center and variation.
- Use random samples to compare populations.
- Understand representative samples (random samples) and populations.
- Use samples to draw inferences about populations.
- Compare two populations from random samples using measures of center and variability.

**Activities:**

1. Provide students with magazines and newspapers with stories containing circle

and bar graphs. Have them work together to read and interpret the graphs.

1. Write each of these numbers on an index card: 12, 12, 15, 20, 22, 23, 30, and 31. Shuffle the cards and arrange them in three piles according to their tens digits. Cut each card apart between the tens and ones digits, keeping the tens separate from the ones. In the tens pile, stack the 1s into one pile, stack the 2s into another pile, and the 3s into a third pile. For each tens pile, arrange the ones digits from least to greatest to the right of the 1, 2, or 3. You have made a stem-and-leaf diagram of the numbers on the cards.

**Gifted and Talented Activities**:

1. Have students work in pairs to generate the computer graphs.

1. Have students choose one of the types of graphs described in this chapter and construct two graphs with different points of view for the following data. One graph should show that attendance remained about the same at Water World from 1990 to 1994; the other should show a sharp drop in attendance. Have the students share their strategies. Water World Attendance

**1990** 135,000
**1991** 131,000
**1992** 118,000
**1993** 94,000 **1994** 90,000

**Chapter 9 - Geometric Shapes and Angles**

**Standards** -

**7.G.A.2 -** Draw (with technology, with ruler and protractor, as well as freehand) geometric shapes with given conditions. 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.
**7.G.B.4 -** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
**7.G.B.5 -** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
**7.G.B.6 -** 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.
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**Objectives:**

- Find the circumference of a circle.
- Find the area of a circle.
- Find perimeters and areas of composite figures.
- Construct a polygon with given measures.
- Use facts about angle relationships to find unknown angle measures.
- Draw geometric shapes with given conditions, focusing on triangles.
- Solve problems involving the area and circumference of a circle.
- Understand pi and its estimates.
- Use facts about supplementary, complementary, vertical and adjacent angles.
- Solve real-world and mathematical problems involving area of two-dimensional objects.

**Activities:**

1. Have students draw angles and then exchange and measure the

angles.

2. Hold pictures of a geometric figure, either a triangle or a quadrilateral. Then have students give as many names as possible to classify the figure.

**Gifted and Talented Activities:**

1. Have students divide the following trapezoid into four congruent trapezoids having the same shape as the original figure.

2. Only two rectangles with sides that are whole numbers have a perimeter and an area with the same number of units. Have students find at least one of them. (4X4 *or* 6X3)

**Chapter 10 - Surface Area and Volume**

**Standards** -

**7.G.A.3 -** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

**7.G.B.4 -** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

**7.G.B.6 -** 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.

**MP.1:** Make sense of problems and persevere in solving them

**MP.2:** Reason abstractly and quantitatively

**MP.3:** Construct viable arguments and critique the reasoning of others

**MP.4:** Model with mathematics

**MP.5:** Use appropriate tools strategically

**MP.6:** Attend to precision

**MP.7:** Look for and make use of structure

**MP.8:** Look for and express regularity in repeated reasoning

**Objectives:**

- Find the surface area of a prism.
- Find the surface area of a cylinder.
- Find the surface area of a pyramid.
- Find the volume of a prism.

- Find the volume of a pyramid.
- Describe the cross sections of a solid
- Describe the cross sections that result from slicing three-dimensional figures.
- Solve problems involving the area and circumference of a circle.
- Solve real-world and mathematical problems involving surface areas and volumes of objects composed of prisms, pyramids, and cylinders.

**Activities:**

1. Cut out 12 identical squares. How many different rectangles can you make with 12 squares? What are the dimensions of the rectangles? (3; 12x1, 6x2, 3x4) How many different rectangles can you make with 7 squares? What are the dimensions of the rectangle? (1; 1x7) Explain why you were able to make more rectangles with 12 squares than with 7 squares. ( 12 has 6 factors that can be paired to make three rectangles. Seven has only tow factors, so only one rectangles can be made.

2. Material needed - Graph paper. Work in groups of three. Each person should mark off a 10 x 10 square on graph paper. One person should shade 1/2 of his or her square, a second person should shade 3/5, and the third person should shade 27/50. Use your drawings to compare the fractions. Which is the smallest? Which is the largest? Write the fractions from least to greatest (1/2, 27/50, 3/5)

**Gifted and Talented Activities**

1. A car manufacturer has two factories. At one factory there are 8 assembly lines and at the other there are only 6. If each factory must produce the same number of cars in a day, what would be the least number of cars produced at each factory in a day? (24)
According to federal law, the length of a United States flag must be 1.9 times its width. Draw three legal U.S. flags of different sizes.