Grade 7 Math Question Stem Bank: Common Core State Standards

Standards for Mathematical Practice

Ratios & Proportional Relationships

Standard	Basic: Conceptual "Understand"	Standard: Procedural "Doing"	Expanded: Application
7.RP.A.1 Rates - Ratios	½ ÷ ¼ = _____ 25/30 ÷ 10/6 = _____	If a person walks ½ mile in each ¼ hour, what is the unit rate as a complex fraction...? If a person walks 6 miles in 2 hours, what is the unit rate…? vs unit rate in miles per hour…? If ½ gallon of paint covers ⅛ of the wall, how much paint will we need for the whole wall...?	Which of the following methods is the best way to solve the following word problem…? Create and solve your own ratio problem.
7.RP.A.2 Proportional Relationship between Quantities	Determine if these two ratios equivalent: $2/4$ *and* $4/8$ $16/w = 2/6$ and $w =$_____	Represent the relationship between the two variables on this graph in an equation… Do these ratios form a proportion: 14 green marbles and 6 red marbles 7 green marbles and 3 red marbles	The table below represents the relationship between the number of donuts and price. Do the numbers show a proportional relationship...? Find the missing number to complete the linear relationship in this table.
7.RP.A.3 Proportional Relationship for multi-step ratio and Percent	What is 78% *of* 50? _____ $\%$ *of* $90 = 81$	A school has 90 students and 30% are 4th graders. How many 4th graders are at that school? Brittney has a recipe that calls for ¾ teaspoons of butter for every 2 cups of milk. If Britney is using 3 cups of milk, how much butter will she need? Julie cut a piece of wood for her project. She cut it 4 feet long. She needed it 4 and ¼ feet long. What was her percent error?	Sam bought a football jersey on sale for 40% off. He paid $30 and it was originally priced at $45. Was he charged the correct amount? Sam wants to buy a computer that costs $550. He is waiting for a sale to bring the price below $400. Create a scenario.

The Number System

Standard	Basic: Conceptual "Understand"	Standard: Procedural "Doing"	Expanded: Application
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.	Use a number line to add -5+7	A student, John, is always forgetting his pencil. At this point, he owes his teacher 3 pencils. If he comes to school with a new pack of pencils containing 5 new pencils, how many will he have after he settles his debt?	

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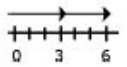
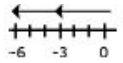
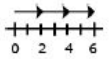
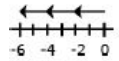
<table>
<tr>
<td>7.NS.A.2
Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</td>
<td></td>
<td>Which of the following fractions is equivalent to -⅘?
-⅘, -16/20, -4/-5</td>
<td>Examine the family of equations in the table below. What patterns are evident? Create a model and context for each of the products. Write and model the family of equations related to 3 x 4 = 12
<table>
<tr><th>Equation</th><th>Number Line Model</th><th>Context</th></tr>
<tr><td>2 x 3 = 6</td><td> 
</td><td>Selling two packages of gum at $3.00 per pack</td></tr>
<tr><td>2 x -3 = -6</td><td> 
</td><td>Spending $3.00 each on 2 packs of gum.</td></tr>
<tr><td>-2 x -3 = 6</td><td> 
</td><td>Forgiving 3 debts of $2.00 each</td></tr>
<tr><td>-2 x3 = -6</td><td> 
</td><td>Owing $2.00 to each of 3 friends</td></tr>
</table>
</td>
</tr>
</table>

7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.	Calculate [-10(-0.9)]-[(-10)*0.11]	Bob's cell phone company is automatically deducting $44 from his bank account every month. How much will the deductions be for the year? It took a submarine 20 seconds to drop 100 feet below sea level from the surface. What was the rate of descent?	

Expressions and Equations

Standard	Basic: Conceptual "Understand"	Standard: Procedural "Doing"	Expanded: Application
7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	Combine like terms…	Write an equivalent expression for: 3(x + 5) -2 A rectangle is twice as long as its width. One way to write the expression to find the perimeter would be w+w+2w+2w. Write the expression two other ways.	Beth says the following two expressions are equivalent. Is she Correct? Explain why or why not. 2(3x -2) + 4x 10x - 2
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.	Explain why one would rewrite an equation in context Ex:: 20% discount is the same as finding 80% of the cost "c" as (*0.80c*)	All varieties of brand X chips are $1.50. A person buys plain, cheese flavor, and BBQ flavor. Write an expression that represents the total cost, T, of the chips if *p* represents the number of plain, *c* represents the number of cheese, and *b* represents the number of BBQ chips.	The expression 9M + 9A + 27 represents the weekly wages earned of Mike "*M*" and Anne "*A.*" Their hourly wage is $9 per hour. This week Mike made an additional $27 in overtime. Is this expression correct? What is another way to represent this expression? Given a square pool as shown below, write four different expressions to find the total number of tiles in the border. Explain how each of the expressions relates to the diagram and demonstrate that the expressions are equivalent. Which expression is most useful? Explain.

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 reasonable-ness of answers using mental computation and estimation strategies.		Three students conduct the same survey about hours their fellow students sleep at night. In which survey are there the *most* people sleeping 8 hours? The results of the survey are as follows: Jamal reported that 0.365 of the people he surveyed get 8 hours of sleep Susan reported that 18 of the 48 people she surveyed get 8 hours of sleep Jason reported that 36% of the people he surveyed get 9 hours per sleep.	

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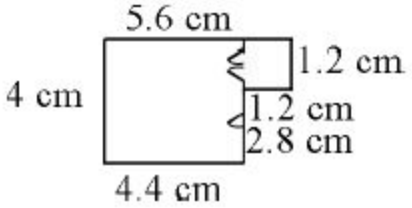
7.EE.B.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	Solve ⅓ x -4 = -16	The band is going on a trip to the state fair. The trip costs $40. Included in that price is $11 for a concert ticket and 2 passes for rides/games. Each of the passes costs the same price. Write an equation representing the cost of the trip.	Examine 2 provided solutions to this problem and explain which is correct and why. The sum of 3 consecutive even numbers if 48. What is the smallest of these numbers?

Grade 7 Math Question Stem Bank: Common Core State Standards

Standards for Mathematical Practice

Geometry

Standard	Basic: Conceptual "Understand"	Standard: Procedural "Doing"	Expanded: Application
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.	Create a scale drawing using a scale factor of 1 foot = 3 cm of a room that is 15 feet by 15 feet.	Jamal shows the scale drawing of his room below. If each 2cm on the scale drawing is equivalent to 5 ft, what are the actual dimensions of Jamal's room?  	
7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles	Draw a geometric shape with the following given parameters (parameters could include parallel lines, angles, perpendicular lines, line segments, etc.)	Can a triangle have more than one obtuse angle? Explain your reasoning.	Is it possible to draw a triangle with a 90 degree angle and one leg that is 4 inches long and one leg that is 3 inches long? If so, draw one. Is there more than one such triangle? (note: pythagorean theorem is not expected)

from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.			
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.	Understand the resulting face shape from cuts made parallel and perpendicular to the bases of right rectangular prisms and pyramids. Ex: Cuts made parallel will take the shape of the base whereas cuts made perpendicular will take the shape of the lateral (side) face. Angle cuts will produce a parallelogram.		Create a diagram of the resulting cuts on the following figure(s)    ___ ___

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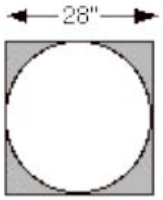
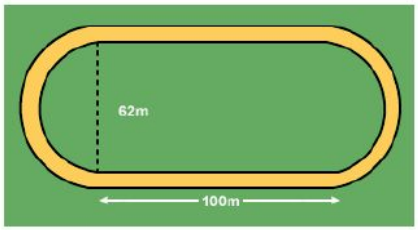
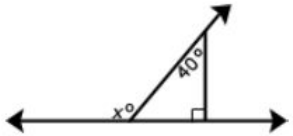
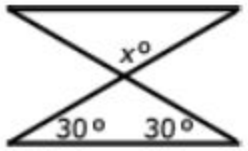
Standards for Mathematical Practice

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.	Understand or Identify the relationship between radius and diameter.	The class is building a mini-golf game for the school carnival. The end of the putting green is a circle. If the circle is 10 feet in diameter, how many square feet of grass carpet is needed to cover the circle? (use 3.13 for pi) How might someone communicate this information to the salesperson to make sure he receives a piece of carpet that is the correct size?	If a circle is cut from a square piece of plywood, how much plywood would be left over?  What is the perimeter of the *inside* of the track? 
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.	Understand angles and use deductive reasoning to write and solve problems.	Write and solve an equation to find the measure of angle *x*. 	Find the measure of angle *x.* 

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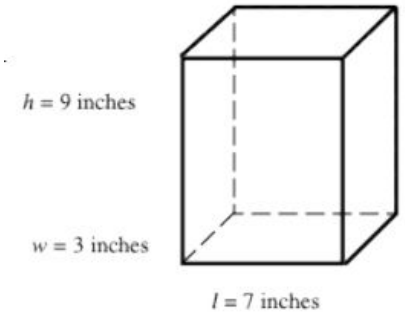
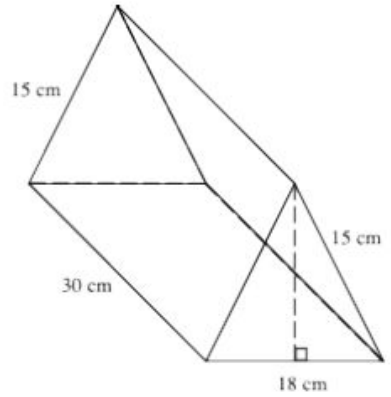
Standards for Mathematical Practice

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.	Determine the dimension of the figure given area or volume. A triangle has an area of 6 feet. The height is 4 feet. What is the length of the base?	Bella covered the box with sticky decorating paper. The paper costs $0.03 per square inch. How much money will Bella need to spend on paper? 	Jenny purchased a box of crackers from the deli. The box is in the shape of a triangular prism. If the volume of the box is 3,240 cubic centimeters, what is the height of the triangular face of the box? How much packing material was used to construct the cracker box? Explain how you got your answer. 

Statistics & Probability

Standard	Basic: Conceptual "Understand"	Standard: Procedural "Doing"	Expanded: Application
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.	You want to learn about eating patterns of students in 7th grade. You can not measure all 7th graders. How can you generate valid data with a smaller sample? (ex: sample is random and representative of that total population)		The school food service is trying to increase the number of students buying hot lunch in the cafeteria. The student council is conducting a survey of the student body to determine students' preferences for hot lunch. They have 3 ways to do the survey. Which data collection method should the student council use and why? 1. Write all the students' names on cards and pull them out in a drawing to determine who will complete the survey. 2. Survey the first 20 students entering the lunchroom 3. Survey every 3rd student who gets off a bus

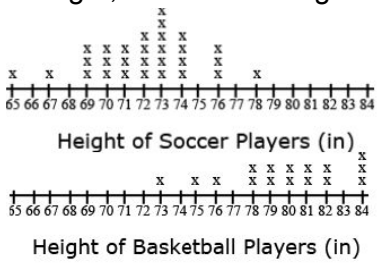
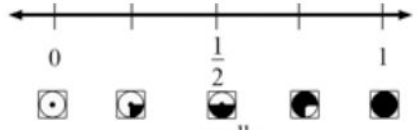
<table>
<tr>
<td>7.SP.A.2
Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.</td>
<td></td>
<td>Below is the data collected from two random samples of 100 students. Make at least two inferences based on the results

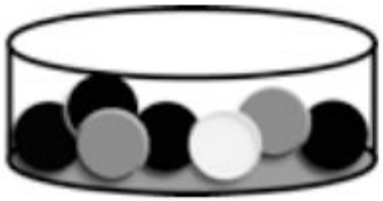
<table><tr><th>Student Sample</th><th>Hamburgers</th><th>Tacos</th><th>Pizza</th><th>Total</th></tr><tr><td>#1</td><td>12</td><td>14</td><td>74</td><td>100</td></tr><tr><td>#2</td><td>12</td><td>11</td><td>77</td><td>100</td></tr></table></td>
<td></td>
</tr>
<tr>
<td>7.SP.B.3
Informally assess the degree 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</td>
<td>Compare two data sets and looking for the degree of overlap.

What is the mean/median of these two data sets?
Are the distributions of these two data sets similar?</td>
<td></td>
<td>Jason wanted to compare mean height of players on his favorite basketball and soccer teams. He thinks the mean height of the players on the basketball team will be greater, but does not know how much greater.

He also wonders if the variability of heights of the athletes is related to the sport they play. He thinks there will be a greater variability in the heights of soccer players as compared to basketball players. He used rosters and player statistics.

Analyze this data to determine the mean</td>
</tr>
</table>

of variability.			absolute deviation, variation in data sets, mean height, etc. Is Jason right? 
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	Understand MAD (Mean Absolute Deviation) Understand measures of center (Mean and Median)	Calculate the MAD for these data sets... Calculate the Mean for these data sets... Calculate the Median for these data sets...	The two data sets below depict random samples of the management salaries in two different corporations. Based on the data sets below, which measure of center will provide the most accurate estimation of the salaries for each company? Explain why. Company A: 1.2 million, $242,000, $140,000, $281,000, $265,000, $211,000 Company B: 5 million, $154,000, $250,000, $250,000, $200,000, $160,000, $190,000
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.	Looking at the model below, label which represents impossible probability and which represents equal likelihood and likely probability.  	There are three colors of socks in a drawer: white, black and red. The probability of getting white is 5/10, the probability of getting red is ⅕, what is the probability of getting black?	The container below has 2 gray, 1 white and 4 black marbles. Without looking, if Erin chooses a marble from the container, will the probability be closer to 0 or to 1 that Erin will select a white marble? A grey marble? A black marble? Justify each of your predictions.

Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 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	When collecting data from a probability experiment, as the number of trials increases, what happens to the experimental probability? (relative to theoretical probability)	If you toss a coin 50 times and you get 27 heads and 23 tails. What is the theoretical probability of heads? What is your relative frequency of heads? Explain why these numbers are not the same.	A bag contains 100 marbles, some are read and some are purple. Suppose a student, without looking, chooses a marble out of the bag, records the color, and then places the marble back in the bag. The student has recorded 9 red marbles and 11 purple marbles. Using these results, predict the number of red marbles in the bag. (adapted from SREB publication *Getting Students Ready for Algebra I)*

probability.			
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	Looking at this data set, what are some possible sources of discrepancy?	If Kimberly chooses a point in this square, what is the probability that it is not in the circle? 	Conduct an experiment using a styrofoam cup by tossing the cup and recording how it lands. How many trials did you conduct? How many times did it land right side up? How many times upside down? The side? Determine probability for each of the above results.
7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	Explain a tree diagram, frequency table, or organized list use to determine probability of compound events.		How many ways could 3 students (Peyton, Brianna and Jamal) come in 1st, 2nd and 3rd place?

Grade 7 Math Common Core State Standards

Ratios & Proportional Relationships

Analyze proportional relationships and use them to solve real-world and mathematical problems.

CCSS.MATH.CONTENT.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 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction* $^{1/2}/_{1/4}$ *miles per hour, equivalently 2 miles per hour*.

CCSS.MATH.CONTENT.7.RP.A.2 Recognize and represent proportional relationships between quantities.

- CCSS.MATH.CONTENT.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.
- CCSS.MATH.CONTENT.7.RP.A.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- CCSS.MATH.CONTENT.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* $t = pn$.
- CCSS.MATH.CONTENT.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 (1,r) where r is the unit rate.

CCSS.MATH.CONTENT.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.

The Number System

Apply and extend previous understandings of operations with fractions.

CCSS.MATH.CONTENT.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.

- CCSS.MATH.CONTENT.7.NS.A.1a Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged*.
- CCSS.MATH.CONTENT.7.NS.A.1b Understand $p + q$ as the number located a distance $|q|$ from$p$, in the positive or negative direction depending on whether q is positive or negative. 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.
- CCSS.MATH.CONTENT.7.NS.A.1c Understand subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$. 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.
- CCSS.MATH.CONTENT.7.NS.A.1d Apply properties of operations as strategies to add and subtract rational numbers.

CCSS.MATH.CONTENT.7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

- CCSS.MATH.CONTENT.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 (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

CCSS.MATH.CONTENT.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 *p* and *q* are integers, then –(*p*/*q*) = (–*p*)/*q* = *p*/(–*q*). Interpret quotients of rational numbers by describing real-world contexts.

CCSS.MATH.CONTENT.7.NS.A.2c Apply properties of operations as strategies to multiply and divide rational numbers.

CCSS.MATH.CONTENT.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.

CCSS.MATH.CONTENT.7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.[1]

1 Computations with rational numbers extend the rules for manipulating fractions to complex fractions.

Expressions & Equations

Use properties of operations to generate equivalent expressions.

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

CCSS.MATH.CONTENT.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."*

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

CCSS.MATH.CONTENT.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 3/4 inches long in the center of a door that is 27 1/2 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*.

CCSS.MATH.CONTENT.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.

CCSS.MATH.CONTENT.7.EE.B.4a Solve word problems leading to equations of the form *px* + *q*= *r* and *p*(*x* + *q*) = *r*, where *p*, *q*, and *r* are specific rational numbers. Solve equations of these forms fluently. 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?*

CCSS.MATH.CONTENT.7.EE.B.4b Solve word problems leading to inequalities of the form *px* +*q* > *r* or *px* + *q* < *r*, where *p*, *q*, and *r* are specific rational numbers. 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*.

Geometry

Draw construct, and describe geometrical figures and describe the relationships between them.

CCSS.MATH.CONTENT.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.
CCSS.MATH.CONTENT.7.G.A.2 Draw (freehand, with ruler and protractor, and with technology) 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.
CCSS.MATH.CONTENT.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.

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

CCSS.MATH.CONTENT.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.
CCSS.MATH.CONTENT.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.
CCSS.MATH.CONTENT.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.

Statistics & Probability

Use random sampling to draw inferences about a population.

CCSS.MATH.CONTENT.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.
CCSS.MATH.CONTENT.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*.

Draw informal comparative inferences about two populations.

CCSS.MATH.CONTENT.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*.
CCSS.MATH.CONTENT.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*.

Investigate chance processes and develop, use, and evaluate probability models.

CCSS.MATH.CONTENT.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 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
CCSS.MATH.CONTENT.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*.
CCSS.MATH.CONTENT.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.
CCSS.MATH.CONTENT.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*.
CCSS.MATH.CONTENT.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?*
CCSS.MATH.CONTENT.7.SP.C.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
CCSS.MATH.CONTENT.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.
CCSS.MATH.CONTENT.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.
CCSS.MATH.CONTENT.7.SP.C.8c Design 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?*