



## ***Mathematics Arts State Standards Grade 7***

### ***Standards for Mathematical Practice – “HOW”***

#### ***My student can:***

- make sense of problems, persevere in solving them, and check the reasonableness of answers.
- reason with and flexibly use math symbols, numbers, and operations.
- construct mathematical arguments (using stated assumptions, definitions, previously established results, and logical progressions) and critique the math reasoning of others.
- recognize math in everyday life and use math to solve real problems.
- use tools (e.g., protractor, calculator) strategically to solve problems and deepen understanding.
- calculate accurately, use precise math definitions and vocabulary, and express math ideas clearly.
- look for and make use of patterns and structure in math.
- discern when calculations are repeated and look both for general methods and for shortcuts.

### ***Math Content Standards – “WHAT” Ratios and Proportional Relationships***

#### ***My student can:***

- identify a proportion as two equal ratios; use proportions to solve real-world and mathematical problems. 7.RP.1
- solve a proportion and compute unit rates by cross multiplying. 7.RP.1
- compute unit rates associated with ratios of fractions, including ratios of lengths, areas, & other quantities. 7.RP.1
- understand and show proportional relationships between quantities. RP.2
- 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). RP.2A
- identify the “constant of proportionality” (unit rate) in tables, graphs, equations, & diagrams of proportions. 7.RP.2B
- represent proportional relationship with equations. 7.RP.2
- explain what a point  $(x,y)$  on the graph of a proportional relationship means in regard to the situation. 7.RP.2D

- use proportional relationships to solve multi-step ratio and percent problems (e.g., simple interest, tax, markups, markdowns, gratuities, commissions, fees, percent increase and decrease, percent error). 7.RP.3

## ***The Number System***

### ***My student can:***

- add, subtract, multiply & divide rational numbers including negatives, integers, fractions and decimals. 7.NS.1-3
- show addition and subtraction of rational numbers on a horizontal or vertical number line diagram. 7.NS.1
- describe situations in which opposite quantities combine to make 0. 7.NS.1A
- understand that when adding a number to a quantity ( $p + q$ ), the result is located the distance of the absolute value  $|q|$  away from  $p$  in either the positive or negative direction. For example, in  $4 + -7$ , the answer is located  $|-7|$  or 7 away from 4 in the negative direction. 7.NS.1B
- understand that subtraction of rational numbers is the same as adding the inverse:  $p - q = p + (-q)$ . 7.NS.1C
- show that the distance between rational numbers on the number line is equal to the absolute value of their difference (e.g., 3 is located 9 away from  $-6$ ;  $|3 - (-6)| = 9$ ) and apply this principle in real-world contexts. 7.NS.1C
- apply properties of operations (commutative, additive inverse, identity properties) as strategies to add and subtract rational numbers. 7.NS.1D
- use the distributive property when multiplying rational numbers, including fractions & negative numbers. 7.NS.2A
- understand the rules for multiplying negative & positive numbers and apply them in real-world contexts. 7.NS.2A
- understand that integers can be divided as long as the divisor is not zero, and that every quotient of integers (with a non-zero divisor) is a rational number. If  $p$  and  $q$  are integers, then  $-(p/q) = (-p)/q = p/(-q)$ . 7.NS.2B
- apply properties of operations as strategies to multiply and divide rational numbers. 7.NS.2C
- convert a rational number to a decimal using long division; understand that the decimal form of a rational number ends in 0s or eventually repeats. 7.NS.2D
- solve real-world and mathematical problems involving the four operations with rational numbers. 7.NS.3

## ***Expressions and Fractions***

### ***My student can:***

- apply the commutative and associative properties of operations as strategies to add and subtract linear expressions with rational coefficients. For example,  $-4x + (3 + x) = -4x + (x + 3) = (-4x + x) + 3 = -3x + 3$ . 7.EE.1
- apply the distributive property to add and subtract linear expressions with

- rational coefficients. 7.EE.1
- apply the distributive property to factor linear expressions with rational coefficients:  $6x + 9 = 3(2x + 3)$ . 7.EE.1
  - understand that rewriting an expression in different forms can shed light on the problem and how the quantities are related. For example,  $a + 0.05a = 1.05a$  means that "increase by 5%" is the same as "multiply by 1.05." 7.EE.2 .
  - solve multi-step real-life & math problems that include positive & negative numbers in any form (whole numbers, fractions, decimals); apply properties of operations to calculate; convert between forms when needed. 7.EE.3
  - use mental math and estimation strategies to determine if a solution is reasonable. 7.EE.3
  - use variables to represent quantities and construct simple equations to solve problems through reasoning. 7.EE.4
  - use equations like  $px + q = r$  and  $p(x + q) = r$  to solve word problems (rational numbers only); solve equations in these forms easily and quickly; compare an algebraic solution to an arithmetic solution. 7.EE.4A
  - write simple inequalities to solve word problems in the form  $px + q > r$  or  $px + q < r$  (rational numbers only). 7.EE.4B
  - graph the solution set of an inequality and explain the graph in the context of the problem. 7.EE.4B

## **Geometry**

### **My student can:**

- draw, construct, and describe geometrical figures and describe the relationships between them. 7.G.1-3
- use & create scale drawings to determine the dimensions (e.g., actual lengths & area) of geometric figures. 7.G.1
- reproduce a scale drawing at a different scale. 7.G.1
- construct triangles from 3 measures of angles or sides, noting when the conditions create a unique triangle. 7.G.2
- describe (name) the two-dimensional figures that results from slicing cross-sections of three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. 7.G.3
- solve real-life and mathematical problems involving angle measure, areas, surface area, and volume. 7.G.4-6
- state and apply the formulas for area and circumference of a circle. 7.G.4
- give an informal explanation of the relationship between the circumference and area of a circle.
- 7.G.4 identify and define supplementary, complementary, vertical and adjacent angles. 7.G.5
- use knowledge about angles in multi-step problems to solve simple equations for an unknown angle. 7.G.5
- solve real-world and mathematical problems involving area, volume and surface area of two- and three dimensional objects that are composed of triangles, quadrilaterals, polygons, cubes, and right prisms. 7.G.6

## ***Statistics and Probability***

### ***My student can:***

- understand that statistics can be used to gain information about a population by examining a sample; generalizations about a population from a sample are valid only if the sample is representative. 7.SP.1
- explain how random sampling tends to produce representative sampling and support valid inferences. 7.SP.1
- use data from a random sample to draw inferences about population with an unknown characteristic. 7.SP.2
- generate multiple samples of the same size to gauge the variation in estimates or predictions. 7.SP.2
- visually and informally compare two numerical data distributions, measuring the difference between the centers by expressing it as a multiple of a measure of variability. 7.SP.3
- find the difference in the mean or median of two different data sets. SP.3
- use measures of center & variability for data from random samples to draw informal comparisons. 7.SP.4
- 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. 7.SP.5
- estimate the probability of a chance event by collecting data & observing its long-run relative frequency. 7.SP.6
- develop probability models and use them to find probabilities of events. SP.7
- find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. 7.SP.8
- understand that the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. 7.SP.8A
- design and use a simulation to generate frequencies for compound events. 7.SP.8C