

# Richmond Public Schools

## Curriculum Framework

### 7<sup>th</sup> Grade Math

Strand: Number and Number Sense	
<b>7.1 The student will</b> <b>d) determine square roots of perfect squares;* and</b> <b>e) identify and describe absolute value of rational numbers.</b>  *On the state assessment, items measuring this objective are assessed without the use of a calculator.	
Suggested Pacing	
First Nine Weeks- 4 Instructional Days	
Spiraling Standards	
<b>Spiraling Down:</b>  6.3 The student will a) identify and represent integers; c) identify and describe absolute value of integers.  6.4 The student will recognize and represent patterns with whole number exponents and perfect squares.	<b>Spiraling Up:</b>  8.3 The student will a) estimate and determine the two consecutive integers between which a square root lies; and b) determine both the positive and negative square roots of a given perfect square.
Essential Questions	Common Misconceptions
<b>7.1d</b> <ul style="list-style-type: none"><li>How is taking a square root different from squaring a number?<ul style="list-style-type: none"><li>Squaring a number and taking a square root are inverse operations.</li></ul></li></ul> <b>7.1e</b> <ul style="list-style-type: none"><li>Why is the absolute value of a number positive?</li></ul>	<ul style="list-style-type: none"><li>Students often associate an exponent of 2 as a factor of 2. For example, they may think that 50 is a perfect square because they know that <math>25 \times 2 = 50</math>.</li><li>Students associate absolute value with opposite numbers. For example, because the absolute value of -3 is 3, they may think the absolute value of 5 is -5.</li></ul>

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- The absolute value of a number represents distance from zero on a number line regardless of direction. Distance is positive.

#### Understanding the Standard

#### Essential Knowledge and Skills

##### 7.1d

- A perfect square is a whole number whose square root is an integer. Zero (a whole number) is a perfect square. (e.g. 4, 16).
- A square root of a number is a number which, when multiplied by itself, produces the given number (e.g.,  $\sqrt{121}$  is 11 since  $11 \cdot 11 = 121$ ).
- The symbol  $\sqrt{\quad}$  may be used to represent a non-negative (principal) square root. Students in grade 8 mathematics will explore the negative square root of a number, denoted  $-\sqrt{\quad}$ .
- The square root of a number can be represented geometrically as the length of a side of a square.
- Squaring a number and taking a square root are inverse operations.

##### 7.1e

- The set of integers includes the set of whole numbers and their opposites,  $\{\dots -2, -1, 0, 1, 2 \dots\}$ . Zero has no opposite and is neither positive nor negative.
- The set of rational numbers includes the set of all numbers that can be expressed as fractions in the form  $\frac{a}{b}$  where  $a$  and

**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:**

- Identify the perfect squares from 0 to 400. (d)
- Determine the positive square root of a perfect square from 0 to 400. (d)
- Demonstrate absolute value using a number line. (e)
- Determine the absolute value of a rational number. (e)
- Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle to solve practical problems. (e)

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$a$  and  $b$  are integers and  $b$  does not equal zero. The decimal form of a rational number can be expressed as a terminating or repeating decimal. A few examples of rational numbers are:

$\sqrt{25}$ ,  $\frac{1}{4}$ ,  $-2.3$ ,  $82$ ,  $75\%$ ,  $4.\overline{59}$

- Rational numbers may be expressed as positive and negative fractions or mixed numbers, positive and negative decimals, integers and percents.
- Proper fractions, improper fractions, and mixed numbers are terms often used to describe fractions. A proper fraction is a fraction whose numerator is less than the denominator. An improper fraction is a fraction whose numerator is equal to or greater than the denominator. An improper fraction may be expressed as a mixed number. A mixed number is written with two parts: a whole number and a proper fraction (e.g.,  $3\frac{5}{8}$ ). Fractions can be positive or negative.
- The opposite of a positive number is negative and the opposite of a negative number is positive.
- Negative numbers lie to the left of zero and positive numbers lie to the right of zero on a number line.
- Smaller numbers always lie to the left of larger numbers on the number line.

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<ul style="list-style-type: none"> <li>The absolute value of a number is the distance from 0 on the number line regardless of direction. Distance is positive (e.g., <math> \frac{-1}{2}  = \frac{1}{2}</math> ).</li> <li>The absolute value of zero is zero.</li> </ul>	
<b>Vocabulary</b>	<b>Instructional Activities Organized by Learning Objective</b>
<p>Rational Numbers Whole number Integer Perfect Squares Square root Inverse operations Area of square Length of square Absolute Value</p>	<p><b>Virginia Department of Education</b></p> <ul style="list-style-type: none"> <li><a href="#">Lesson on Square Root</a></li> <li><a href="#">Lesson on Absolute Value</a></li> </ul> <p><b>Textbook:</b> <b>Eureka</b> SOL 7.1d - SOL 7.1e - <a href="#">Grade 6: Module 3:Topic B: Lesson 11- 13</a> Virginia Math Connects, Course 2, ©2012, Glencoe/McGraw-Hill page(s) 52 - 56, 76-80; 181-184, 186(in part);</p>
<b>Assessment</b>	
	<p><b>Notes:</b> <a href="#">Square Roots and Absolute Values</a></p> <p><b>Resources:</b></p> <ul style="list-style-type: none"> <li>Print             <ul style="list-style-type: none"> <li>Virginia Coach, New SOL Edition, Mathematics, Grade 7, @2018, Triumph Learning pg(s) 31 - 40</li> </ul> </li> <li>Technology-based             <ul style="list-style-type: none"> <li><a href="#">Introductions to Perfect and Square Roots</a></li> </ul> </li> </ul>

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	<b>Station Activities:</b> <a href="#">Square and Square Review</a>
<b>Cross-Curricular Connections</b>	<b>Tiered Differentiations</b>
<p>Reading – <a href="#">Absolute Location</a> – Students will read about how absolute value is used in providing the distance between locations.</p>	<p><b>Square Roots</b></p> <p>(Tier 2) Students are given squares(foam, card stock, etc) and create model representation of a perfect square as it relates to area. (Tier 3) Students are given a 12 by 12 multiplication chart and highlight the perfect square numbers. Teacher then gives the students a worksheet to determine square roots.</p> <p><b>Absolute Value</b></p> <p>(Tier 3) Students are given integer word phrases. They're to first determine whether it is a positive or negative integer. Second, they're to determine their distance from the context of zero.</p>