

## 7<sup>th</sup> Grade Module 2 – Rational Numbers

	4 - Mastery	3 - Proficient	2 - Basic	1 - Below Basic	0 - No Evidence
Topic A - Add and Subtract Rational Numbers (7.NS.1)	<p>Meets <b>all</b> of the criteria in a Level 3</p> <p><b>Completes tasks including synthesis and evaluation</b></p>	<p><b>Describe</b> situations in which opposite quantities combine to make zero.</p> <p>Show the addition and subtraction of <b>rational numbers</b> on a horizontal or vertical number line using directional distance and absolute value.</p> <p>Add and subtract <b>rational numbers</b> without the use of calculators <b>using Associative and Commutative properties as strategies.</b></p>	<p><b>Identify real world situations</b> in which opposite quantities combine to make zero.</p> <p>Show the adding and subtracting of <b>integers</b> on a horizontal or vertical number line using <b>directional distance and absolute value.</b></p> <p>Add <b>and</b> subtract <b>integers</b> without the use of calculators, showing subtraction by <b>adding the additive inverse.</b></p>	<p><b>Identify that a number and its opposite</b> combine to make zero.</p> <p>Show the adding and subtracting of <b>integers</b> on a horizontal <b>or</b> vertical number line using <b>counting strategies.</b></p> <p>Add <b>or</b> subtract <b>integers</b> without the use of calculators</p>	<p><b>Shows no evidence of proficiency</b></p> <p>Little evidence of reasoning or application to solve the problem.</p>
Topic B – Multiply and Divide Rational Numbers (7.NS.2)	<p>Meets <b>all</b> of the criteria in a Level 3</p> <p><b>Completes tasks including synthesis and evaluation</b></p>	<p><b>Justify why</b> the product/quotient of a series of numbers is positive or negative</p> <p>Multiply and divide <b>rational</b> numbers without the use of a calculator <b>using Associative, Commutative, Distributive and Identity properties as strategies.</b></p> <p>Convert a rational number to a terminating <b>and</b> repeating decimal using long division.</p>	<p>Identify if the product/quotient of <b>a series of numbers</b> is positive or negative</p> <p>Multiply and divide <b>rational</b> numbers in real world contexts without the use of a calculator, <b>and interpret the solution.</b></p> <p>Convert a rational number to a terminating <b>or</b> repeating decimal using long division.</p>	<p><b>Identify</b> if the product/quotient of two numbers is positive or negative</p> <p>Multiply and divide <b>integer</b> numbers without the use of a calculator</p> <p>Convert a rational number to a <b>terminating</b> decimal using long division, <b>to tenths.</b></p>	<p><b>Shows no evidence of proficiency</b></p> <p>Little evidence of reasoning or application to solve the problem.</p>
Topic C – All Operations with Rational Numbers (7.NS.3, 7.EE.2, 7.EE.4)	<p>Meets <b>all</b> of the criteria in a Level 3</p> <p><b>Completes tasks including synthesis and evaluation</b></p>	<p>Rewrite algebraic expressions containing <b>rational numbers</b> using the properties of operations, and explain the expressions in context of a situation</p> <p>Write and solve equations containing <b>rational numbers</b> in context of a situation and be able to</p> <ul style="list-style-type: none"> <li>identify the sequence of the operations used to solve the</li> </ul>	<p>Rewrite algebraic expressions containing integers using the properties of operations <b>and explain the expressions in context of a situation</b></p> <p><b>Write</b> and solve equations containing integer numbers <b>in context of a situation</b> and be able to</p> <ul style="list-style-type: none"> <li>identify the sequence of the operations used to solve the equation</li> </ul>	<p>Rewrite algebraic expressions containing integers using the properties of operations</p> <p><b>Solve equations</b> containing integer numbers and be able to</p> <ul style="list-style-type: none"> <li>identify the sequence of the operations used to solve the equation</li> <li>compare the algebraic solution to an arithmetic</li> </ul>	<p><b>Shows no evidence of proficiency</b></p> <p>Little evidence of reasoning or application to solve the problem.</p>

		equation <ul style="list-style-type: none"> <li>compare the algebraic solution to an arithmetic solution</li> </ul>	<ul style="list-style-type: none"> <li>compare the algebraic solution to an arithmetic solution</li> </ul>	solution	
--	--	---	--	----------	--

**7. NS.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.

- Describe situations in which opposite quantities combine to make 0.
- 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.
- Understand subtraction of rational numbers as adding the additive inverse.
- Apply properties of operations as strategies to add and subtract rational numbers.

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

- 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.
- 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.
- Apply properties of operations as strategies to multiply and divide rational numbers.
- 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.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

**7.EE.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, means that "increase by" is the same as "multiply by."*

**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 word problems leading to equations of the form  $ax + b = c$  and  $ax + b = c$ , where  $a$ ,  $b$ , and  $c$  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  $cm$ . Its length is  $cm$ . What is its width?*