Just In Time Quick Check

Standard of Learning (SOL) 8.2

Strand: Number and Number Sense

Standard of Learning (SOL) 8.2

The student will describe the relationships between the subsets of the real number system.

Grade Level Skills:

- Describe and illustrate the relationships among the subsets of the real number system by using representations (graphic organizers, number lines, etc.). Subsets include rational numbers, irrational numbers, integers, whole numbers, and natural numbers.
- Classify a given number as a member of a particular subset or subsets of the real number system, and explain why.
- Describe each subset of the set of real numbers and include examples and non-examples.
- Recognize that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - Organizing Numbers (word)/ (PDF)
- VDOE Co-Teaching Mathematics Instruction Plans (MIPS)
  - Real Number System (word) / (PDF)
- VDOE Algebra Readiness Formative Assessments
  - SOL 8.2 (word) / (PDF)
- VDOE Algebra Readiness Remediation Plans
  - Real Numbers (word) / (PDF)
- VDOE Word Wall Cards: Grade 8 (Word) | (PDF)
  - Comparing Real Numbers
  - Natural Numbers
  - Whole Numbers
  - Integers
  - Rational Numbers
  - Irrational Numbers
  - Real Numbers
- Desmos Activity
  - Card Sort: Real Number Statements
  - Polygraph: 8.2 Rational and Irrational Numbers
  - Real Number Sort: Always, Sometimes, Never

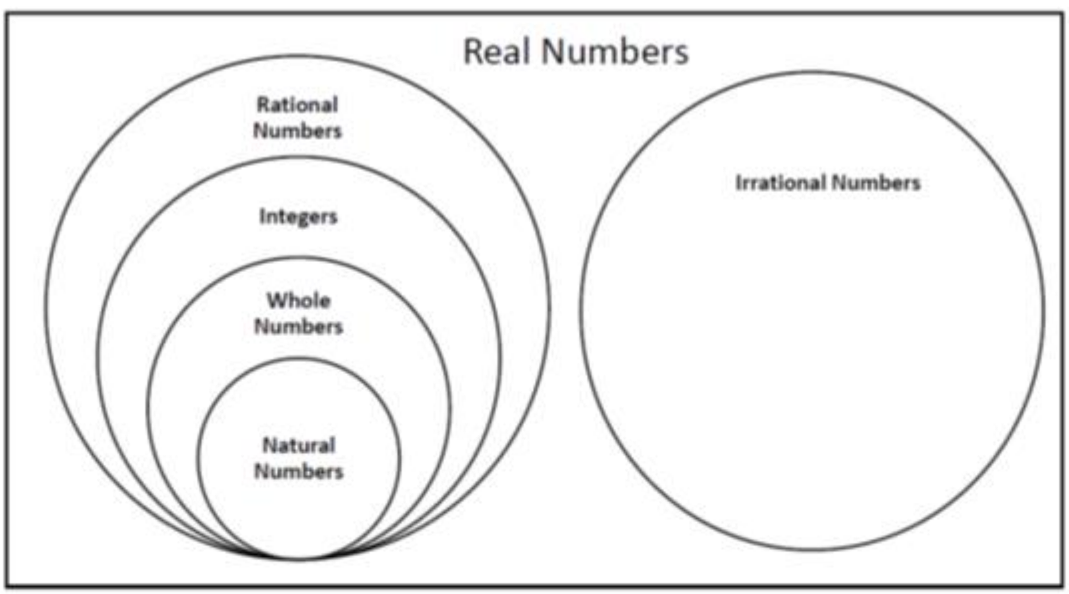
Supporting and Prerequisite SOL: 8.3b, 7.1d, 7.1e, 6.2a, 6.3a, 6.3c, 6.4

SOL 8.2 - Just in Time Quick Check

1) Classify each given number as a member of a particular subset or subsets of the real number system. Place an x in each appropriate box.

Value	Rational Number	Irrational Number	Integer	Whole Number	Natural Number
$-\sqrt{49}$					
$4.\overline{25}$					
-3.625					
$\frac{18}{3}$					

2) Consider the diagram of the relationship between the sets of real numbers.



Place each value into the most appropriate subset using the diagram above.

3.14	$\frac{2}{3}$	$\sqrt{2}$	$-\frac{40}{5}$	0	17

3) For each statement below, determine whether it is true or false. Justify your reasoning.

a) Repeating decimals are irrational numbers.

b) The sum of a rational number and an irrational number will be irrational.

c) All whole numbers are natural numbers.

d) All integers are whole numbers.

e) The product of two rational numbers will always be irrational.

4) For each subset of the real numbers provide one example and one non-example. Justify your reasoning.

	Description	Example	Non-example
Rational Numbers			
Irrational Numbers			
Integers			
Whole Numbers			
Natural Numbers			

SOL 8.2 - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1) For each value in the table classify each subset of the real number system it belongs. Place an x in each appropriate box.

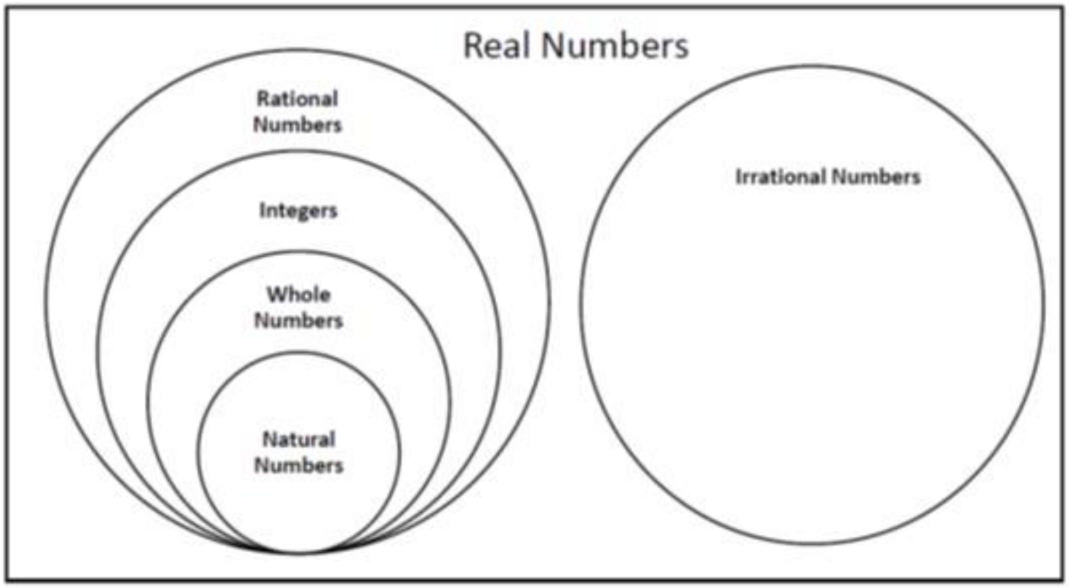
Value	Rational Number	Irrational Number	Integer	Whole Number	Natural Number
$-\sqrt{49}$					
$4.\overline{25}$					
-3.625					
$\frac{18}{3}$					

A common error students may make is not including all the subsets for a given value. This may indicate the student does not understand a value can belong to several subsets. Teachers may consider using a visual representation or diagram to illustrate how the subsets fit into one another.

A common misconception for $4.\overline{25}$ is saying it is irrational. This may indicate students do not know all characteristics for irrational numbers and assume all non-terminating decimals are irrational. Teachers may want to work with students on converting between repeating decimals and fractions to allow students to see how they fit the definition of rational numbers.

A common error students may make for $-\sqrt{49}$ and $\frac{18}{3}$ is to not simplify the values. This may indicate students do not recognize a value can be represented in a variety of ways and would benefit from more practice simplifying perfect squares and fractions.

2) Consider the diagram of the relationship between the sets of real numbers.



Place each value into the diagram above in the one section it fits best.

3.14	$\frac{2}{3}$	$\sqrt{2}$	$-\frac{40}{5}$	0	17

A common error students may make is placing 3.14 into the irrational subset. This may indicate that a student recognizes 3.14 as an approximation of pi and considers it as an irrational number. Teachers may consider working with students on equivalency and refer to the Grade 6 Mathematics Curriculum Framework (see SOL 6.2a).

A common error for $-\frac{40}{5}$ is not simplifying the fraction. This may indicate students do not recognize a value can be represented in a variety of ways. Students would benefit from more practice simplifying fractions, especially those that are equivalent to an integer value.

3) For each statement below, determine whether it is true or false. Justify your reasoning.

a) Repeating decimals are irrational numbers.

b) The sum of a rational number and an irrational number will be irrational.

c) All whole numbers are natural numbers.

d) All integers are whole numbers.

e) The product of two rational numbers will always be irrational.

A common misconception students may have is to think that repeating decimals do not terminate and therefore belong to the subset of irrational numbers. This may indicate students do not know all characteristics for irrational numbers and assume all non-terminating decimals are irrational. Teachers may want to work with students on converting between repeating decimals and fractions to allow students to see how they fit the definition of rational numbers.

A common error students may make is incorrectly answering parts b and e. This may indicate that students struggle with understanding sums and products of rational and irrational numbers. Teachers may want to give students several rational and irrational numbers and explore sums and products of these numbers to discover patterns that exist.

A common error a student may make with c and d is misunderstanding the word "all" in the statements. This may indicate students do not understand the relationship between subsets. Teachers may consider using visuals such as diagrams to explore the relationship between the different subsets.

4) Describe each subset of real numbers below. Provide at least one example and one non-example

	Description	Example	Non-example
Rational Numbers			
Irrational Numbers			
Integers			
Whole Numbers			
Natural Numbers			

A common misconception students may make is saying integers are "all positive and negative numbers". This may indicate that students could benefit from more practice with the vocabulary. Teachers may want to have students look at examples of numbers and discuss if they are all integers to help students understand they need to be more specific. Using examples such as -5.25 and $-\frac{3}{4}$ *would show students that you can have negative values that are not integers.*