LESSON MAKER PRO

Number Set Detective

Trace each number through the real number system.

GRADE 8 · 8.NS.2.a

8.NS.2.a "Describe and illustrate the relationships among the subsets of the real number system by using representations (e.g., graphic organizers, number lines). Subsets include rational numbers, irrational numbers, integers, whole numbers..."

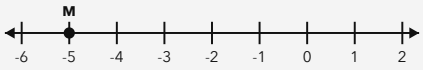
NAME _____ DATE _____

NESTED NUMBER SETS

Real numbers are either rational or irrational. Rational numbers can be written as fractions, including integers and terminating or repeating decimals. Natural numbers start with 1, and the sets nest like this: natural numbers are whole numbers, whole numbers are integers, and integers are rational numbers.

WORKED EXAMPLE

Point M is shown on the number line. List every subset of the real number system that contains M.

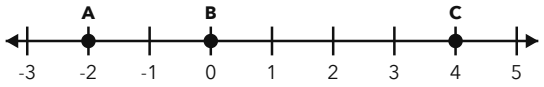


1. M represents -5.
2. -5 is an integer.
3. Every integer is rational, and every rational number is real.

Answer: integer, rational number, real number

PRACTICE 6 problems

1 Points A, B, and C are shown on the number line. List every subset that contains each point.



ANSWER _____

2 List every subset of the real number system that contains 7/8.

ANSWER _____

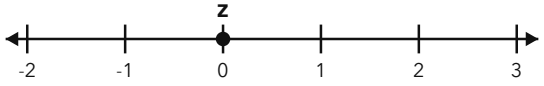
3 Evaluate sqrt(49). Then list every subset of the real number system that contains it.

ANSWER _____

4 List every subset of the real number system that contains -11.

ANSWER _____

5 Point Z is shown on the number line. List every subset that contains Z.



ANSWER _____

6 Which subsets contain sqrt(18)? Explain briefly.

ANSWER _____

APPLY IT Show your work

1 A student downloads a 3.25 GB update for a favorite game. Which subsets of the real number system contain 3.25?

WORK SPACE

ANSWER _____

2 The design club makes a square sticker with an area of 20 cm^2. Its side length is sqrt(20) cm. Which subsets of the real number system contain the side length?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A classmate says, "If a number is rational, then it is a whole number." Is the statement true or false? Give one counterexample and state every subset that contains your counterexample.

WORK SPACE AND ANSWER

ANSWER KEY

Number Set Detective

GRADE 8 · 8.NS.2.a

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Points A, B, and C are shown on the number line. List every subset that contains each point.	**A: integer, rational number, real number; B: whole number, integer, rational number, real number; C: natural number, whole number, integer, rational number, real number**
2	List every subset of the real number system that contains 7/8.	**rational number, real number**
3	Evaluate sqrt(49). Then list every subset of the real number system that contains it.	**sqrt(49) = 7; natural number, whole number, integer, rational number, real number**
4	List every subset of the real number system that contains -11.	**integer, rational number, real number**
5	Point Z is shown on the number line. List every subset that contains Z.	**whole number, integer, rational number, real number**
6	Which subsets contain sqrt(18)? Explain briefly.	**irrational number, real number. Since 18 is not a perfect square, sqrt(18) is irrational.**

PART 2 · APPLY IT

1. **rational number, real number** 3.25 is a terminating decimal, so it can be written as a fraction. Therefore it is rational and real.
2. **irrational number, real number** Since 20 is not a perfect square, sqrt(20) cannot be written as a ratio of integers. It is irrational and therefore real.

CHALLENGE

False. For example, 5/9 is a rational number and a real number, but it is not a whole number.

Accept equivalent wording for the subsets, such as rational and real. Accept any valid rational counterexample in the challenge, as long as the student correctly states that it is not whole.