

Number Neighborhoods

Sort real numbers into the sets where they belong.

GRADE 8 • 8.NS.2

8.NS.2 "The student will investigate and describe the relationship between the subsets of the real number system. Describe and illustrate the relationships among the subsets of the real number system by using representations (e.g...."

NAME _____

DATE _____

HOW THE SETS CONNECT

Natural numbers are counting numbers that start at 1. Whole numbers include zero and all natural numbers, and integers include negative integers, zero, and positive integers. Rational numbers can be written as a/b , where b is not zero, while irrational numbers cannot be written as a fraction; both rational and irrational numbers are real numbers.

WORKED EXAMPLE

Classify -14 in every subset where it belongs.

1. -14 is a negative integer.
2. $-14 = -14/1$, so it is rational.
3. Every rational number is real.

Answer: -14 is an integer, rational number, and real number. It is not whole, natural, or irrational.

PRACTICE 6 problems

- 1** Write the nested sets from smallest to largest. Use the words natural, whole, integers, rational, and real.

ANSWER _____

- 2** Can a number be both rational and irrational? Explain in one sentence.

ANSWER _____

- 3** Classify 5 in every subset where it belongs.

ANSWER _____

- 4** Classify $-3/8$ in every subset where it belongs.

ANSWER _____

- 5** Classify 2.4 in every subset where it belongs.

ANSWER _____

- 6** Classify $\sqrt{11}$ in every subset where it belongs.

ANSWER _____

APPLY IT Show your work

- 1** At a gaming event, Maya's score change is -18 points after a penalty. Classify -18 in every subset where it belongs.

WORK SPACE

ANSWER _____

- 2** An art club makes a square sticker with an area of 20 square centimeters. The side length is $\sqrt{20}$ centimeters. Classify $\sqrt{20}$ in every subset where it belongs.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A student labels $\sqrt{36}$ as "rational only." Is the label complete? Explain, and list every subset where $\sqrt{36}$ belongs.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Write the nested sets from smallest to largest. Use the words natural, whole, integers, rational, and real.	natural $\subset$ whole $\subset$ integers $\subset$ rational $\subset$ real
2	Can a number be both rational and irrational? Explain in one sentence.	No. A rational number can be written as a fraction, while an irrational number cannot.
3	Classify 5 in every subset where it belongs.	natural, whole, integer, rational, real
4	Classify $-3/8$ in every subset where it belongs.	rational, real
5	Classify 2.4 in every subset where it belongs.	rational, real
6	Classify $\sqrt{11}$ in every subset where it belongs.	irrational, real

PART 2 • APPLY IT

- integer, rational, real** -18 is a negative integer. It can be written as $-18/1$, so it is rational and therefore real.
- irrational, real** Because 20 is not a perfect square, $\sqrt{20}$ is not an integer and cannot be written as a fraction. It is irrational, and all irrational numbers are real.

CHALLENGE

No. $\sqrt{36} = 6$, so it is natural, whole, integer, rational, and real.

Use natural numbers as 1, 2, 3, and so on. Accept equivalent explanations that correctly state the nesting of the sets and that rational and irrational numbers do not overlap.