

Properties of real numbers

NAME:

This worksheet will try to make the properties of real numbers more meaningful and memorable. We will use them a lot during the semester. Having them firmly in your head will make algebra easier.

Definition of a real number

Our class only deals with real numbers. The real numbers are essentially every number you've seen so far in life except the imaginary (or complex numbers) such as $7 + 3i$ or $\sqrt{-5}$.

Real numbers include fractions (or rational numbers), zero, negatives, and even irrational numbers like $\sqrt{2}$ or π .

Definition of an integer

An integer is a number in the set $\{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$. We will refer to integers many times during the semester. We will also talk about **non-negative integers**; they are composed of the positive integers and zero.

Closure of real numbers over multiplication and addition

This property makes algebra work. It says if I take two real numbers and multiply, add, subtract, or divide them, I'll still have a real number when I'm through. The real numbers are said to be closed under addition, multiplication, subtraction, and division. This makes

it possible to say that if x is a real number, then $\frac{3x^4 + 4x^{-2}}{5x - 7x^3 + 2}$ is also a real number.

This is important because as we deal with expressions like $\frac{3x^4 + 4x^{-2}}{5x - 7x^3 + 2}$, we have to remember that all it is, is a real number.

We know a lot about real numbers and how they behave. To understand algebra, we have to somehow transfer that knowledge to algebraic expressions that represent real numbers.

This worksheet will help us investigate many properties of real numbers. We will explore a property using actual numbers, and then we look at how it is used with variables.