

The Number System

Domain Overview

GRADE 6

Sixth graders continue their previous understanding of the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to explain why the procedures for dividing fractions make sense. Students use visual models and equations to divide whole numbers by fractions and fractions by fractions to solve word problems. Students work with the system of rational numbers, including negative rational numbers. Sixth graders focus on the order and absolute value of rational numbers and location of points in all four quadrants of the coordinate plane.

GRADE 7

Seventh graders develop an understanding of number, recognizing fractions, decimals, and percents as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all

rational numbers and explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. Seventh graders solve real-world and mathematical problems involving all four operations with rational numbers.

GRADE 8

Eighth graders learn to distinguish between rational and irrational numbers. Building on seventh grade understanding, students recognize that the decimal equivalent of a fraction will either terminate or repeat and they convert repeating decimals into their fraction equivalents. Finally, eighth graders use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions.

SUGGESTED MATERIALS FOR THIS DOMAIN

| 6 | 7 | 8 | |
|---|---|---|---|
| ✓ | | | Adding machine tape (optional, used to create number lines) |
| | ✓ | | Algeblocks™ or Algebra Tiles™ |
| ✓ | | | Coordinate grids |
| ✓ | | | Decimal blocks |
| ✓ | | | Factor trees |
| ✓ | ✓ | ✓ | Number lines |
| ✓ | | | Pattern blocks |
| ✓ | ✓ | | Two-color counters |

KEY VOCABULARY

| 6 | 7 | 8 | |
|---|---|---|---|
| ✓ | ✓ | | absolute value distance from 0 on a number line |
| | ✓ | | additive inverse a number that, when added to another number, gives a sum of zero |
| ✓ | | | algorithm a set of steps used to solve a mathematical computation such as long division |
| ✓ | | | common factor a factor that two or more numbers have in common |
| | ✓ | | complex fraction a fraction with a fraction in the numerator and/or a fraction in the denominator |
| ✓ | | | coordinate plane a plane formed by the intersection of a horizontal number line (called the x-axis) with a vertical number line called the y-axis. The number lines intersect at their zero points called the origin. |
| ✓ | | | coordinates set of numbers, or a single number, that locates a point on a line, on a plane, or in space |
| ✓ | | | denominator the bottom number of a fraction that shows how many equal parts the whole is divided into |
| ✓ | | | distributive property the property that states that multiplying a sum by a number is the same as multiplying each addend by the number and then adding the products. The distributive property is $a \times (b + c) = (a \times b) + (a \times c)$. |
| ✓ | | | dividend the number to be divided |
| ✓ | | | divisor the number that divides the dividend in a division problem |

(Continued)

KEY VOCABULARY

6 7 8

| | | | |
|---|---|---|--|
| ✓ | | | factors numbers that divide without remainders into the number such as 2 and 3 are factors of 6 |
| ✓ | | | greatest common factor (GCF) the largest factor that two or more numbers have in common |
| ✓ | ✓ | ✓ | integers the whole numbers and their opposites |
| ✓ | | ✓ | irrational numbers non-repeating, non-terminating decimals |
| ✓ | | | least common multiple (LCM) the smallest multiple that two or more numbers have in common |
| ✓ | | | multiplicative inverse another name for reciprocal. When you multiply a number by its "multiplicative inverse," you get 1. Example: $6 \times \frac{1}{6} = 1$. |
| ✓ | | | multi-digit more than one digit |
| ✓ | | | multiple the result of multiplying a number by an integer such as 15 is a multiple of 3, as $3 \times 5 = 15$ |
| ✓ | | | numerator the top number in a fraction. In the fraction $\frac{3}{8}$, 3 is the numerator that tells how many of 8 parts. |
| ✓ | | | ordered pairs a pair of numbers used to show the position on a graph, where the "x" (horizontal) value is first, and the "y" (vertical) value is second |
| ✓ | | | prime factorization determining which prime numbers multiply together to make the original number |
| ✓ | | | quadrant the x- and y-axes divide the coordinate plane into four sections labeled, counterclockwise, I, II, III, and IV, with Quadrant I having all points with positive x and y coordinates |
| ✓ | | | quotient the number obtained by dividing one quantity by another |
| | ✓ | ✓ | rational numbers repeating or terminating decimals; any decimal that can be written in fraction form |
| | ✓ | ✓ | repeating decimal a decimal in which, after a certain point, one digit or a set of digits repeat themselves an infinite number of times. Repeating digits are designated with a bar above them. |
| ✓ | ✓ | | signed numbers positive and negative numbers |
| | ✓ | ✓ | terminating decimal decimal form of a rational number that ends in 0 |