

Chapter 10 Sixth Grade

Integers

Introduction to Integers

Integers – A set of numbers made up of the counting numbers, their opposites, and 0.

Opposites are two numbers the same distance from 0 on the number line. -4 and 4 are opposites. $-(-6)$ means the opposite of -6.

Absolute value – An integer's distance from zero. Distance is always positive. $|5| = 5$ $|-7| = 7$

Comparing Integers – On a number line, integers to the left are less and to the right are greater.

$$6 > 4 \quad 3 > 0 \quad 2 > -1 \quad -3 > -6 \quad -7 > -8$$

Rational Numbers

Rational Number – any number that can be shown as the quotient of two integers.

Thus, rational numbers may be shown as a fraction or a decimal (or a whole number).

Examples:

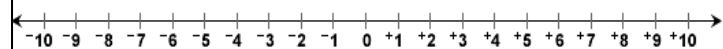
$$\frac{1}{3} \quad 4 = \frac{4}{1} \quad 0.73 = \frac{73}{100}$$

Reminder: to change a fraction into a decimal, divide the numerator (top) by the denominator (bottom).

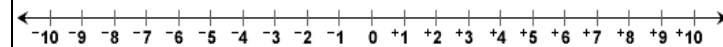
Adding Integers

On a number line:

Adding a positive integer means to move to the right. (the sum becomes greater.)



Adding a negative integer means to move to the left. (the sum becomes less.)



Adding Integers		
Case	Rule	Examples
Positive + positive	Add normally.	$5 + 4 = 9$ $3 + 11 = 14$ $1 + 1 = 2$
Negative + negative	Add the absolute values; make the answer negative.	$-3 + -7 = -10$ $-2 + -2 + -2 = -6$ $-1 + -1 = -2$
Positive + negative	Subtract the negative number from the positive.	$4 + -3 = 4 - 3 = 1$ $7 + -1 = 7 - 1 = 6$ $2 + -10 = 2 - 10 = -8$
Negative + positive	Subtract the negative number from the positive.	$-5 + 1 = 1 - 5 = -4$ $-3 + 10 = 10 - 3 = 7$ $-8 + 8 = 8 - 8 = 0$

Subtracting Integers		
Subtracting an integer is the same as adding its opposite.		
Case	Rule	Examples
Positive - positive	Subtract normally.	$3 - 2 = 1$ $2 - 3 = -1$ $1 - 10 = -9$
Negative - negative	Keep the first number negative; add the second number.	$-3 - (-7) = -3 + 7 = 4$ $-2 - (-2) = -2 + 2 = 0$ $-1 - (-1) = -1 + 1 = 0$
Positive - negative	Make the second number positive and add.	$4 - (-3) = 4 + 3 = 7$ $7 - (-1) = 7 + 1 = 8$ $2 - (-10) = 2 + 10 = 12$
Negative - positive	Add the absolute values and make the answer negative.	$-5 - 1 = -6$ $-3 - 10 = -13$ $-8 - 8 = -16$

Multiplying and Dividing Integers		
Case	Rule	Examples
Positive x positive or Positive ÷ positive	Same signs: Positive.	$5 \times 4 = 20$ $3 \times 11 = 33$ $10 \div 5 = 2$
Negative x negative or Negative ÷ negative	Same signs: Positive.	$-3 \times -7 = 21$ $-2 \times -2 = 4$ $-42 \div -7 = 6$
Positive x negative or Positive ÷ negative	Different signs: Negative.	$4 \times -3 = -4 \times 3 = -12$ $7 \times -1 = -7 \times 1 = -7$ $20 \div -10 = -20 \div 10 = -2$

Multiplying and Dividing Integers		
Multiply or divide normally. Follow the rule for the sign.		
Case	Rule	Examples
Positive x positive or Positive ÷ positive	Positive.	$5 \times 3 = 15$ $4 \times 6 = 24$
Negative x negative or Negative ÷ negative	Positive.	$-5 \times -3 = 15$ $-4 \times -6 = 24$
Positive x negative or Positive ÷ negative	Negative.	$5 \times -3 = -15$ $4 \times -6 = -24$
Negative x positive or Negative ÷ positive	Negative.	$-5 \times 3 = -15$ $-4 \times 6 = -24$