



# An Introduction to Integers

---


Mastering Positive Numbers, Negative  
Numbers, and Absolute Value



# Introduction

---

Before we define them, let's think about why we need integers. How do we talk about a temperature that's below freezing, or the idea of owing money? Integers are the numbers that let us describe a value and its opposite. They help us measure things in two directions from a starting point.





01



# Introduction to Integers

---





# Overview of Integers

---

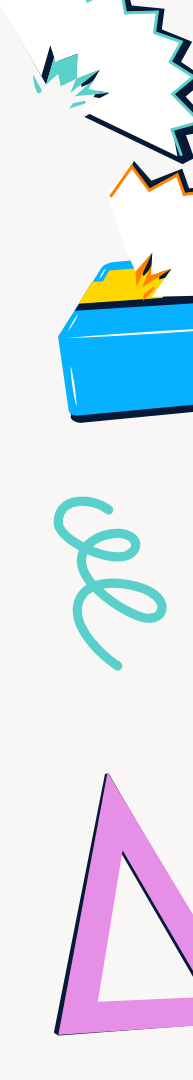
Integers are all positive whole numbers, their negative counterparts, and zero; they are not fractions or decimals. On a number line, positive numbers are to the right of zero and negative numbers are to the left, with values decreasing as you move left. We often use integers in real-life situations, such as a temperature of  $-5^{\circ}\text{C}$  or a bank account debt of \$50.



# Importance in Mathematics

---

Integers are vital to math because they let us work with concepts beyond simple counting. They are essential for algebra (solving for negative values), graphing in all four quadrants, and describing real-world opposites like debt or cold temperatures, while also ensuring every subtraction problem has a valid answer.

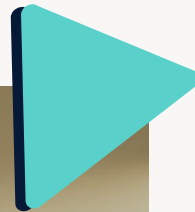




# Learning Objectives

By the end of this lesson, you will be able to:

1. **Define** integers, place them on a number line, and find their **absolute value**.
2. Accurately **add, subtract, multiply, and divide** any two integers.
3. **Solve** multi-step and real-world problems involving integer operations.





02



# Understanding Integers

---





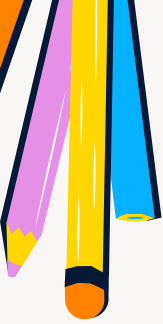


# Definition of Integers

---

An integer is a number from the set of **positive whole numbers** (like 1, 2, 3), their **negative opposites** (-1, -2, -3), and **zero**. The most important rule is that integers are never fractions or decimals. They are the numbers you can picture as perfectly spaced marks on a number line, such as -4, 0, and 52.








# Visual Representation on a Number Line

---


The number line visualizes integers with **zero** at the center. **Positive integers** are to the right and increase in value, while **negative integers** are to the left and decrease in value (so -8 is smaller than -2). This layout makes comparing easy, as any number to the right is always greater, and it shows that opposites, like -5 and 5, are the same distance from zero.





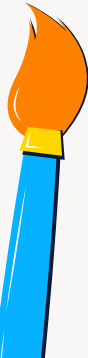
# Real-Life Applications

---



Understanding integers is useful because they appear in many parts of daily life. For example:

- **Weather:** Describing a temperature that is below zero.
- **Finance:** Tracking your savings (positive) or debts (negative).
- **Games:** Gaining or losing points in a video game.





03



# Absolute Value

---






# Concept of Absolute Value

---

Absolute value measures a number's distance from zero on the number line, regardless of its sign. This means that both -5 and 5 have an absolute value of

5, which you write as  $|5| = 5$  and  $|-5| = 5$ .


Understanding this concept helps clarify how we think about numbers in relation to each other.



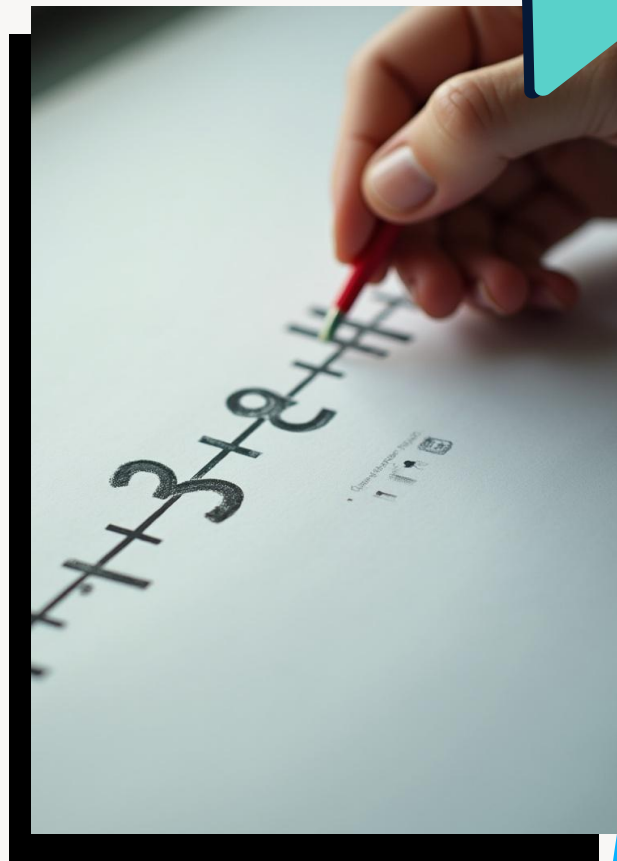
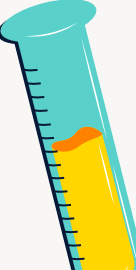


# Visualizing Absolute Value

---



To visualize absolute value, think of a number line. A number's absolute value is its distance from zero, and since distance is always a positive measurement, the result is always positive. This is why opposites like 3 and -3 share the same absolute value; both are 3 steps away from zero, so their absolute value is 3.


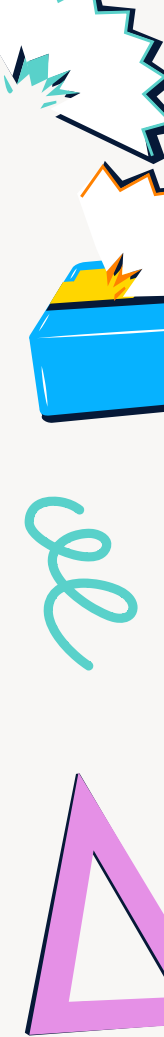




# Importance of Absolute Value in Math

---

Absolute value simplifies various mathematical processes. It helps solve equations and inequalities involving signed numbers and allows us to measure quantities without worrying about direction. Grasping absolute value enhances your overall understanding of math, making it easier to work with integers and develop stronger problem-solving skills.






# 04 Operations with Integers

---

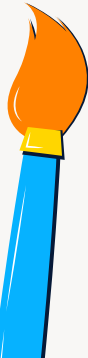
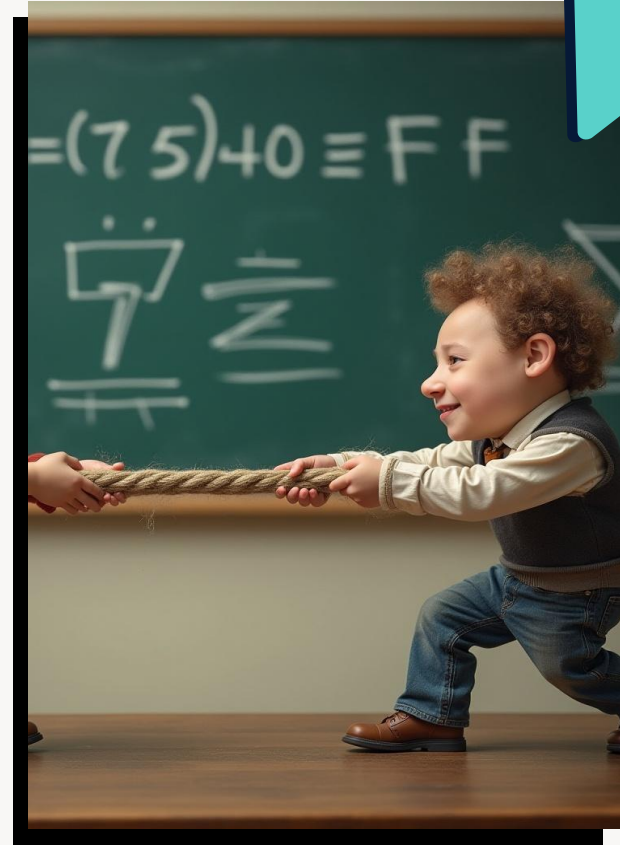
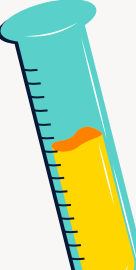


# Adding Integers

---



To add integers, if they have the same sign, add their absolute values and keep that sign. If they have different signs, subtract the smaller absolute value from the larger one and use the sign of the larger. For example,  $(-9) + 4$  equals  $-5$ .








# Subtracting Integers

---

To subtract integers, use the Keep, Change, Change rule: keep the first number, change the subtraction sign to addition, and change the second number's sign to its opposite. For example,  $7 - 10$  becomes  $7 + (-10)$ , or  $-3$ . This also works with negatives, like  $(-4) - (-9)$ , becoming  $(-4) + 9$ , which equals  $5$ . Then just add the integers.





# Multiplying and Dividing Integers

---



Multiplying and dividing integers follows two simple rules. If both integers have the same sign (both positive or both negative), the result is positive (e.g.,  $7 \times 3 = 21$  and  $(-7) \times (-3) = 21$ ). If they have different signs (one positive, one negative), the result is negative (e.g.,  $(-7) \times 3 = -21$  and  $21 \div (-3) = -7$ ). In summary: same signs give a positive result, different signs give a negative result.



# Conclusion

---

Great job on integers! Remember, they are whole numbers (positive or negative). Use Keep, Change, Change for subtraction. Add same signs and subtract different signs. For multiplication and division, same signs are positive, different signs are negative. Keep these rules in mind!

