Adding Integers: Mastering Positive and Negative Numbers

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Adding integers is like being a detective with numbers - you need to understand the 'signs' to solve the mystery! Learning to add positive and negative numbers will help you solve real problems involving temperature changes, money transactions, and even video game scores.

Real-World Connection: Imagine you're playing a video game where you start at ground level (0). You find a treasure chest that gives you +15 points, but then you fall into a trap that costs you -8 points. How do you figure out your final score? Or think about the weather: if it's 5°F outside and the temperature drops by 12 degrees, what's the new temperature? These situations happen all the time, and adding integers is the key to solving them!

Adding Integers with the Same Sign

When you add two integers that have the same sign (both positive or both negative), you add their absolute values and keep the same sign. Think of it like this: if you're walking in the same direction twice, you just keep going further in that direction!

Example 1: (+7) + (+3)

Solution: 7 + 3 = 10, so (+7) + (+3) = +10

Both numbers are positive, so we add 7 + 3 = 10 and keep the positive sign.

Example 2: (-5) + (-4)

Solution: 5 + 4 = 9, so (-5) + (-4) = -9

Both numbers are negative, so we add their absolute values (5 + 4 = 9) and keep the negative sign.

Example 3: (-12) + (-8)

Solution: 12 + 8 = 20, so (-12) + (-8) = -20

Picture this on a number line: starting at -12 and moving 8 more spaces to the left lands you at -20.

Key Points:

* Same signs: add the numbers and keep the sign
* Positive + Positive = Positive (bigger positive number)
* Negative + Negative = Negative (bigger negative number)

Adding Integers with Different Signs

When adding integers with different signs (one positive and one negative), subtract the smaller absolute value from the larger absolute value, then use the sign of the number with the larger absolute value. Think of this as a tug-of-war between positive and negative - the stronger side wins!

Example 1: (+9) + (-5)

Solution: 9 - 5 = 4, so (+9) + (-5) = +4

The positive 9 is stronger than the negative 5. Subtract: 9 - 5 = 4, and since 9 had the positive sign, our answer is +4.

Example 2: (-7) + (+3)

Solution: 7 - 3 = 4, so (-7) + (+3) = -4

The negative 7 is stronger than the positive 3. Subtract: 7 - 3 = 4, and since 7 had the negative sign, our answer is -4.

Example 3: (+6) + (-10)

Solution: 10 - 6 = 4, so (+6) + (-10) = -4

The negative 10 is stronger than the positive 6. Subtract: 10 - 6 = 4, and since 10 had the negative sign, our answer is -4.

Key Points:
* Different signs: subtract and use the sign of the number with the larger absolute value
* Think of it as a battle between positive and negative forces
* The 'stronger' number (larger absolute value) determines the final sign

Understanding Additive Inverse (Opposites)

Every integer has an additive inverse - a number that when added to it equals zero. These are called opposites. For example, +5 and -5 are opposites because they cancel each other out. This is like having $5 and owing $5 - they balance out to $0!

Example 1: (+8) + (-8)

Solution: (+8) + (-8) = 0

These are opposites (additive inverses), so they cancel each other out completely, resulting in zero.

Example 2: (-15) + (+15)

Solution: (-15) + (+15) = 0

No matter which order, opposites always add up to zero. Think of climbing 15 floors up, then going 15 floors down - you're back where you started!

Example 3: (+12) + (-7) + (-12)

Solution: (+12) + (-12) + (-7) = 0 + (-7) = -7

Notice that +12 and -12 are opposites, so they cancel out to 0, leaving only -7.

Key Points:

* Additive inverses (opposites) always add up to zero
* Every positive number has a negative opposite, and vice versa
* This property helps simplify complex addition problems

Vocabulary

Integer: Any whole number that can be positive, negative, or zero (...-3, -2, -1, 0, 1, 2, 3...)
Additive Inverse: Two numbers that are opposites and add up to zero, like +5 and -5
Absolute Value: The distance a number is from zero, always positive (the absolute value of both +7 and -7 is 7)
Sign: Whether a number is positive (+) or negative (-)

Summary:

Adding integers follows two main rules: when signs are the same, add and keep the sign; when signs are different, subtract and use the sign of the larger absolute value. Remember that opposites (additive inverses) always cancel out to zero. These skills help us solve real problems with temperature, money, elevation, and many other situations where we deal with increases and decreases!

Try These:

1. The temperature was -3°F in the morning. By afternoon, it rose 8 degrees. What is the afternoon temperature?

   Answer: _____

2. You have $25 in your account but owe your friend $30. What is your net amount?

   Answer: _____

3. An elevator starts at the 3rd floor, goes down 7 floors, then up 2 floors. What floor is it on?

   Answer: _____

4. (-9) + (+9) + (-4)

   Answer: _____