Signed Numbers (Positives and Negatives)

**Double Signs:** If two signs appear directly in front of a number, they should be combined into a single sign. Two matching signs will result in addition (a single plus sign). Two different signs will be subtraction.

- **Matching → Addition:** $2 + (+1) = 2 + 1$  
  $2 - (-1) = 2 + 1$
- **Different → Subtraction:** $2 - (+1) = 2 - 1$  
  $2 + (-1) = 2 - 1$

**Addition and Subtraction:** When combining two numbers by adding or subtracting, there are two sign rules to follow, but remember to first follow the **Double Signs** rule.

- If the numbers have the **same sign**, add the numbers without the signs, and then the result (sum) will always have the **same sign as the original numbers**.
  
  **Same signs:**  
  - $5 + 3 = 8$  
  - $3 + 5 = 8$  
  - $-5 - 3 = -8$  
  - $-3 - 5 = -8$
  
  All results have the same sign as the original numbers.

- If the numbers have **opposite signs**, first forget the signs. Then find the **difference** between the numbers. Give the result the **same sign as the larger** of the original numbers.
  
  **Opposite signs:**  
  - $5 - 3 = 2$  
  - $-3 + 5 = 2$  
  - $-5 + 3 = -2$  
  - $3 - 5 = -2$

- All results are the same sign as the larger number 5.

**Multiplication and Division:** When **multiplying or dividing** two numbers, there are also two rules to follow:

- If the numbers have the **same sign**, the result (product or quotient) is always **positive**.
  
  **Same signs:**  
  - $12 \cdot 3 = 36$  
  - $-12 \cdot -3 = 36$  
  - $12 \div 3 = 4$  
  - $-12 \div -3 = 4$

  All results are positive.

- If the numbers have **opposite signs**, the result (product or quotient) is always **negative**.
  
  **Opposite signs:**  
  - $-12 \cdot 3 = -36$  
  - $12 \cdot -3 = -36$  
  - $-12 \div 3 = -4$  
  - $12 \div -3 = -4$

  All results are negative.

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**Order of Operations**

When simplifying an expression, the operations must be done in a specific order. The order is:

**Parentheses → Exponents → Multiplication/Division → Addition/Subtraction**

The mnemonic “PEMDAS” is commonly used to help you remember the order.

**Important things to note:** Inside a set of parentheses, order of operations must also be followed. **Multiplication and division** happen at the same time, so they are performed from left to right. **Addition and subtraction** also happen at the same time and are therefore performed from left to right. A more illustrative version of PEMDAS might be:

**PEMDAS**

**Examples:**

- $9 - 3 + 5 = 6 + 5 = 11$  
  - $9 - (3 + 5) = 9 - 8 = 1$  
  - $4 \cdot 3 - 7 = 12 - 7 = 5$
  - $16 \div 2 \cdot 4 = 8 \cdot 4 = 32$  
  - $16 \div (2 \cdot 4) = 16 \div 8 = 2$
- $-3^2 \cdot 2 = -9 \cdot 2 = -1$
- $21 - \left( (-3)^2 + 5 \cdot 2 \right) = 21 - (9 + 5 \cdot 2) = 21 - (9 + 10) = 21 - 19 = 2$

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