Algebraic Properties

- **Commutative Law:** The order of numbers doesn't change the result.
    - Addition:

        a+b=b+aa plus b equals b plus a

        $a+b=b+a$

    - Multiplication:

        a×b=b×aa cross b equals b cross a

        $a×b=b×a$

- **Associative Law:** The way numbers are grouped doesn't change the result.
    - Addition:

        (a+b)+c=a+(b+c)open paren a plus b close paren plus c equals a plus open paren b plus c close paren

        $(a+b)+c=a+(b+c)$

    - Multiplication:

        (a×b)×c=a×(b×c)open paren a cross b close paren cross c equals a cross open paren b cross c close paren

        $(a×b)×c=a×(b×c)$

- **Distributive Law:** Multiplication distributes over addition.
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        a×(b+c)=(a×b)+(a×c)a cross open paren b plus c close paren equals open paren a cross b close paren plus open paren a cross c close paren

        $a×(b+c)=(a×b)+(a×c)$

- **Identity Law:** A number remains unchanged when combined with the identity element.
    - Addition:

        a+0=a a plus 0 equals a

        $a+0=a$

    - Multiplication:

        a×1=a a cross 1 equals a

        $a×1=a$

- **Inverse Law:** A number can be combined with its inverse to result in the identity element.
    - Addition:

        a+(−a)=0a plus open paren negative a close paren equals 0

        $a+(−a)=0$

    - Multiplication:

        a×(1a)=1a cross open paren 1 over a end-fraction close paren equals 1

        $a×(1a)=1$

Other Important Rules

- **Properties of Zero:** Any number plus zero equals itself, and any number multiplied by zero equals zero.
- **Properties of One:** Any number times one equals itself, and any number divided by one equals itself.
- **Equality:** If two things are equal to the same thing, they are equal to each other.