

Properties of Addition & Multiplication

Let $a, b,$ and c be real numbers.

Commutative	Associative
Identity	Inverse

C	A
<p>"Commutate": order changes</p> <p>$a+b = b+a$ $ab = ba$</p> <p>$17+46+3 = 17+3+46$ $12 \times 11 \times 5 = 12 \times 5 \times 11$</p> <p>$(= 20+46 = 66)$ $(= 60 \times 11 = 660)$</p>	<p>(left to Right)</p> <p>$a+b+c = a+(b+c)$ $abc = a(bc)$</p> <p>$14+58+12 = 14+(58+12)$ $26 \cdot 5 \cdot 2 = 26 \cdot (5 \cdot 2)$</p> <p>$(= 14+70 = 84)$ $(= 26 \cdot 10 = 260)$</p>
<p>What gives the identical number (after performing the operation) what can I add to a number and get the identical number?</p> <p>$a+0 = a$</p> <p>$72+0 = 72$</p>	<p>"undoes" the number; equals the identity</p> <p>Additive Inverse (opposite)</p> <p>$a+(-a) = 0$</p> <p>$x+15+(-15) = x$</p> <p>Multiplicative Inverse (Reciprocal)</p> <p>$a \cdot \frac{1}{a} = 1$</p> <p>$\frac{4}{5} \cdot \frac{5}{4} = 1$</p>
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Note: Reciprocal: 1 divided by the number
 * When we multiply a number by its reciprocal, we get 1.

Subtraction: not commutative

ex: $5-3 \neq 3-5$ X

Definition: adding the opposite (additive inverse)

ex: $5-3 = 5+(-3) = -10(-3)+5$ * p3

ex: $5-7-3 = 5+(-7)+(-3)$
 $= 5-10 = -5$

Division

ex: $8 \div 2 \neq 2 \div 8$ X

Definition: multiplying by the reciprocal (multiplicative inverse)

ex: $8 \div 2 = 8 \cdot \frac{1}{2} = 4$