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# Properties of Integers

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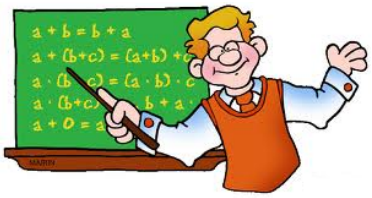
# Closure property



## Closure property under addition

Integers are closed under addition, i.e. for any two integers, a and b, **a+b** is an integer.

**Example**: 3+4=7, 3 and 4 are integers and when we add them the answer we get is 7 which is also an integer, hence the property.

## Closure property under subtraction

Integers are closed under subtraction, i.e. for any two integers, a and b,
**a-b** is an integer.
**Example:** -21 – (-9) = -12, -21 and -9 are integers and when we subtract them the answer we get is -12 which is also an integer, hence the property.

## Closure property under multiplication

Integers are closed under multiplication, i.e. for any two integers,
a and b, **ab** is an integer.
**Example:** 5x 6 =30, 5 and 6 are integers and when we multiplied them the answer we get is 30 which is also an integer, hence the property.

## Closure property under division

Integers are**NOT** closed under division, i.e. for any two integers, a and b, a/b may not be integer.

## Commutative property

## Commutative property under addition

Addition is commutative for integers.  For any two integers, a and b,
**a + b=b + a**
**Example:** 5 + (-6) = 5 – 6 = 1

(-6)+5 = -6 + 5= -1
? 5 + (-6) = (-6) + 5

# Commutative property under subtraction

Subtraction is**NOT** commutative for integers.  For any two integers, a and b,**a – b ? b – a**

**Example:** 8- (-6) = 8 + 6 = 14
(-6) – 8 = - 6 – 8 = -14
? 8 - (-6) ? -6 – 8

# Commutative property under multiplication

Multiplication is commutative for integers.  For any two integers, a and b,**ab=ba**

**Example:** 9 × (-6) = -(9×6) = -54
(-6) × 9= - (6×9) = -54
? 9 × (-6) = (-6) × 9

# Commutative property under division

Division is**NOT** commutative for integers.  For any two integers, a and b,**a/b ? b/a**

**Example:** 3/6=1/2
6/3 = 2
? 3/6 ? 6/3

# Associative property

# Associative property under addition

Addition is associative for integers.  For any three integers, a, b and c,**a+(b+c)=(a+b)+c**

Example: 5 + (-6 + 4) = 5 – 2 = 3
(5 - 6) + 4 = -1 + 4 = 3
? 5 + (-6+4) = (5 - 6) + 4

# Associative property under subtraction

Subtraction is associative for integers.  For any three integers, a, b and c
**a-(b-c) ? (a-b)-c**

Example:5 - (6-4)=5-2=3;
(5-6)-4=-1-4=-5
? 5 - (6-4) ? (5-6)-4

# Associative property under multiplication

Multiplication is associative for integers.  For any three integers, a, b and c,
**(a×b)×c=a×(b×c)**

Example:[(-3)×(-2))×4]=(6×4)=24
[(-3)×(-2×4) ]=(-3×-8)=24
? [(-3)×(-2))×4]=[(-3)×(-2×4)]

# Associative property under division

Division is**NOT** associative for integers.

# Distributive property

# Distributive property of multiplication over addition

For any three integers, a, b and c, **a×(b+c) = a×b+a×c**
Example: -2 (4 + 3) =  -2 (7)  = -14
-2(4+3)=(-2×4)+(-2×3)
=(-8)+(-6)
=-14

# Distributive property of multiplication over subtraction

For any three integers, a, b and c, **a×(b-c)= a×b-a×c**
Example: -2 (4- 3) =  -2 (1)  = -2
-2(4-3)=(-2×4)-(-2×3)
=(-8)-(-6)
=-2

The distributive property of multiplication over the operations of addition and subtraction is true in the case of integers.

# Identity under addition

Integer 0 is the identity under addition.  That is, for an integer a, a+0=0+a=a
Example: 4+0=0+4=4

# Identity under multiplication

The integer 1 is the identity under multiplication.  That is, for an integer a, 1×a=a×1=a
Example: (-4)×1=1×(-4)=-4

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## Reference Links :


- http://en.wikipedia.org/wiki/Integer
- http://en.wikipedia.org/wiki/Closure_(mathematics)
- http://en.wikipedia.org/wiki/Commutativity
- http://en.wikipedia.org/wiki/Associativity
- http://en.wikipedia.org/wiki/Distributivity
- http://en.wikipedia.org/wiki/Identity_element


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