

Khidwai English School

7th std

Integers part 2

Multiplication of integers

$$+ \times + = +$$

$$- \times - = +$$

$$+ \times - = -$$

$$- \times + = -$$

Multiplication of a positive and negative integer

While multiplying a positive integer and a negative integer

We multiply them as a whole number and put in minus sign

before the product We thus get a negative integer..

$$a \times (-b) = (-a) \times b = -ab$$

Example $4 \times -8 = -32$

$$3 \times -7 = -21$$

Multiplication of two negative integer

The product of two negative integer is a positive integer We multiply the two negative integers as whole numbers and put the positive sign before the product

$$(-a) \times (-b) = +ab$$

Example $-10 \times -12 = 120$

$$-5 \times -6 = +30$$

Product of three or more negative integers

*The product of two negative integers is a positive integer

Ex.: -4×-3

$$=+12$$

*The product of three negative integers is a negative integer

Example:-

$$-4 \times -3 \times -2$$

$$=+12 \times -2$$

$$=-24$$

*The product of four negative integers is a positive integer

Example

$$-4 \times -3 \times -2 \times -1$$

$$=+12 \times +2$$

$$=+24$$

We find that if the number of negative integers in a product is even

Then the product is a positive integer if the number of negative integers in a product is odd then the product is a negative integers

I solve the problem

$$\text{a) } -3 \times -9 \quad \text{b) } +6 \times +2. \quad \text{c) } +7 \times -5$$

$$= +27. \quad = +12. \quad -35$$

$$\text{d) } +9 \times -10 \quad \text{e) } -5 \times -2 \times -3$$

$$= -90. \quad = +10 \times -3$$

$$=-30$$

Properties of multiplication of integers

Closure under multiplication

The product of 2 integers is again an integer so we can say that integers are closed under multiplication.

In general $a \times b$ is an integer, for all integers a and b

Example :-

$$-2 \times -5 = +10$$

$$+3 \times +9 = +27$$

$$-12 \times +3 = -36$$

Commutative of multiplication

multiplication is commutative for integers that is $a \times b = b \times a$ for any integers a and b

In general for any two integers a and b

$$a \times b = b \times a$$

Example:-

$$3 \times 4 \text{ or } 4 \times 3 = 12$$

$$-5 \times -2 \text{ or } -2 \times -5 = +10$$

$$+6 \times -3 \text{ or } -3 \times +6 = -18$$

*Multiplication by zero (additive identity)

any whole number when multiplied by zero gives zero

In general for any integer a

$$a \times 0 = 0 \times a = 0$$

Example

$$-3 \times 0 = 0, -9 \times 0 = 0, 0 \times 100 = 0$$

Multiplicative identity

integer 1 is multiplicative identity that is $1 \times a = a \times$

$1 = a$ for any integer a

Example:- $4 \times 1 = 4, 125 \times 1 = 125$

When we multiply -1 to any number $5 \times -1 = -5$, we get additive inverse of an integer a when we multiply -1 to a therefore $a \times -1 = -1 \times a = -a$

*Associativity property

The product of three integers does not depend upon the grouping of integers and this is called the associative property for multiplication integers

In general any three integers a b and C

$$(a \times b) \times c = a \times (b \times c)$$

Example- 3, -2 and 5

$$(-3 \times -2) \times 5 \text{ and } -3 \times (-2 \times 5)$$

$$= +6 \times 5. \qquad = -3 \times -10$$

$$= +30. \qquad = +30$$

we get the same answer in both the cases

Distributive property

Integers are distributive under addition and multiplication that is $a \times (b+c) = a \times b + a \times c$ for any three integers a b and C

Example

$$2 \times (4+3) = 2 \times 4 + 2 \times 3$$

$$= 8 + 6$$

$$= 14$$

$$(-2) \times (3+5) = -2 \times 3 + (-2) \times 5$$

$$= -6 + (-10)$$

$$= -6 - 10$$

$$= -16$$

Solve the problem

- $3 \times -1 = -3$
- $-15 \times 0 = 0$

- $-21 \times -3 = +63$

- $+6 \times -9 = -54$

II Find the product using suitable properties

a) -30×12 or 12×-30

$$= -360$$

b) -12×-6 or -6×-12

$$= +72$$

c) -9×4 or 4×-9

$$= -36$$

d) $(-3 \times -2) \times 5$ or $-3 \times (-2 \times 5)$

$$= +6 \times 5 \qquad = -3 \times -10$$

$$= 30. \qquad = 30$$

e) $(+7 \times -6) \times 3$ $= +7 \times (-6 \times 3)$

$$= -42 \times 3 \qquad = 7 \times (-18)$$

$$= -126 \qquad = -126$$

f) $8 \times (3+9) = 8 \times 3 + 8 \times 9$

$$= 24 + 72$$

$$= 96$$

Division of integers

Division is the inverse operation of multiplication

$$3 \times 5 = 15 \text{ so } 15 \div 5 = 3 \text{ and } 15 \div 3 = 5$$

* We divide a negative integer by a positive integer We divide them as whole numbers and then put a minus sign (-) before the quotient

Example - $12 \div 2 = -6$

* We divide a positive integer by a negative integer we first divide them as whole numbers and then put a minus sign before the quotient

In general for any two positive integers a and b

* any integer divided by zero is meaningless and 0 divided by an integer other than zero is equal to zero therefore For any integer a,

$$a \div 0 \text{ is not defined but } 0 \div a = 0$$

* When we divide a whole number by 1 it gives the same whole number

Fill in the blanks

- $369 \div __ = 369$
- $-75 \div __ = -1$

- $+20 \div \underline{\quad} = -2$

- $\underline{\quad} \div 4 = -3$

- $-87 \div \underline{\quad} = 87$

Answers

1,+75,- 10,- 12,1

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