

**CLASS VII  
MATHEMATICS  
CHAPTER-I  
INTEGERS  
MODULE-5/8**

We have discussed about the properties of integers in our previous modules.

In the module 4/8 we have discussed about all the properties under addition and subtraction.

In this module 5/8 we are going to discuss about the properties under Multiplication

**1. Closure Property under Multiplication.**

For any two integers 'a' and 'b' ,  $a \times b$  is always an integer.

Ex.1) 10 and -15 are integers

$$10 \times (-15) = -150 \text{ is always an } \underline{\text{integer.}}$$

Ex.2) -3 and -20 are integers

$$(-3) \times (-20) = +60 \text{ is always an } \underline{\text{integer.}}$$

So Integers are Closed under Multiplication.

**2. Commutative Property under Multiplication.**

For any two integers 'a' and 'b' ,  $a \times b = b \times a$

Ex.1) -7 and 3

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

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

$$\underline{(-7) \times 3 = 3 \times (-7)}$$

Ex.2) -25 and -4

$$(-25) \times (-4) = +100$$

$$(-4) \times (-25) = +100$$

$$\underline{(-25) \times (-4) = (-4) \times (-25)}$$

**So Integers are Commutative under Multiplication.**

### **3. Associative Property under multiplication.**

For any three integers 'a' , 'b' and 'c'

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

Ex.1) 3, 5 and -6

$$3 \times [ 5 \times (-6) ] = 3 \times [ -30 ] = -90$$

$$(3 \times 5) \times (-6) = 15 \times (-6) = -90$$

$$\underline{3 \times [ 5 \times (-6) ] = ( 3 \times 5 ) \times (-6)}$$

Ex.2) -5 , 10 and -4

$$(-5) \times [ 10 \times (-4) ] = (-5) \times [-40] = +200$$

$$[(-5) \times 10] \times (-4) = [ (-50) \times (-4) ] = +200$$

$$\underline{(-5) \times [10 \times (-4)] = [(-5) \times 10] \times (-4)}$$

**So integers are Associative under Multiplication.**

### **4. Multiplicative Identity.**

For any integer 'a'

$a \times 1 = 1 \times a = a$  , 1 is called multiplicative identity of integers

Ex.  $(-5) \times 1 = 1 \times (-5) = -5$

$$8 \times 1 = 1 \times 8 = 8$$

If we multiply any integer with 1 we will get the same integer again.

So 1 is the multiplicative identity of integers.

### **Applications of these properties.**

Making multiplication easier.

Ex.1)  $(-25) \times 37 \times 4$

$$[(-25) \times 37] \times 4 = (-925) \times 4 = -3700$$

We can do this problem by re arranging the numbers

$$\begin{aligned}(-25) \times 4 \times 37 &= [(-25) \times 4] \times 37 \\ &= (-100) \times 37 = -3700\end{aligned}$$

$$\begin{aligned}\text{Ex.2) } (-18) \times (-10) \times 9 &= [(-18) \times 9] \times (-10) \\ &= (-162) \times (-10) \\ &= +1620\end{aligned}$$

$$\begin{aligned}\text{Ex.3) } -1 \times -5 \times -4 \times -6 &= (-5 \times -4) \times (-1) \times (-6) \\ &= 20 \times (-1) \times (-6) \\ &= (-20) \times (-6) = +120\end{aligned}$$

$$\begin{aligned}\text{Ex.4) } -20 \times -2 \times -5 \times -7 &= [(-2) \times (-5)] \times (-20) \times (-7) \\ &= [10 \times (-20)] \times (-7) \\ &= (-200) \times (-7) = +1400\end{aligned}$$

Ex.5) Suppose we represent the distance above the ground level by +ve integer and below the ground level –ve integer, Then answer the following.

An elevator descends in a mine shaft at the rate of 5m per minute

i) what will be its position after one hour.

ii) If it begins to descends down from 15m above the ground , what is its position after 45minutes .

Ans)

i) since the elevator is going down , so the distance covered by it will be represented by –ve integer.

Change in the position of the elevator after 1 min = -5m

Position of the elevator after 60mints = (-5) x 60 = -300m

That is 300m below the ground level

ii) Change in the position of the elevator in 45mints = (-5) X 45  
= - 225m

That is 225m below the ground .

But it has started from 15m above the ground level =+15m

The final position of the elevator = -225 +15  
= -210m

That is 210m below from the ground level.

**Assignment.**

**1. find the value.**

a)  $3 \times (-1)$

b)  $(-1) \times 225$

c)  $9 \times (-3) \times (-6)$

d)  $(-3) \times (-6) \times (-2) \times (-1)$

e)  $-120 \times (-11) \times (-10)$

**2. Fill in the blanks.**

a)  $-3 \times \underline{\quad} = 27$

b)  $5 \times \underline{\quad} = -35$

c)  $\underline{\quad} \times (-8) = -56$

d)  $\underline{\quad} \times (-12) = 108$

**3. Verify**

i)  $(18 \times 7) \times (-3) = 18 \times [7 \times (-3)]$

ii)  $(-3) \times [(-4) \times (-6)] = [(-3) \times (-4)] \times (-6)$

**4. starting from  $(-1) \times 5$  , write various products showing some patterns to show  $(-1) \times (-3) = 3$**

**5. A certain freezing process requires that room temperature be lowered from  $40^{\circ}\text{C}$  the rate of  $5^{\circ}\text{C}$  every hour . what will be the room temperature 10 hours after the process begin.**

**S.Sahadeva Rao TGT.SS  
AECS-2, Hyderabad**

