- Integers are a bigger collection of numbers which is formed by whole numbers and their negatives.
- You have studied in the earlier class, about the representation of integers on the number line and their addition and subtraction.
- We now study the properties satisfied by addition and subtraction.

  (a) Integers are closed for addition and subtraction both. That is, $a+b$ and $a-b$ are again integers, where a and b are any integers.

  (b) Addition is commutative for integers, i.e., $a+b=b+a$ for all integers a and b.

  (c) Addition is associative for integers, i.e., $(a+b)+c=a+(b+c$) for all integers a,b and c.

  (d) Integer 0 is the identity under addition. That is, $a+0=0+a=a$ for every integer a.

- We studied, how integers could be multiplied, and found that product of a positive and a negative integer is a negative integer, whereas the product of two negative integers is a positive integer. For example, $-2\times 7=-14$ and $-3\times -8=24$.
- Product of even number of negative integers is positive, whereas the product of odd number of negative integers is negative.
- Integers show some properties under multiplication.

  (a) Integers are closed under multiplication. That is, $a\times b$ is an integer for any two integers a and

b

  (b) Multiplication is commutative for integers. That is, $a\times b=b\times$ a for any integers a and b.

  (c) The integer 1 is the identity under multiplication, i.e., $1\times a=a\times 1=a$ for any integer a.

  (d) Multiplication is associative for integers, i.e., $(a\times b)\times c=a\times(b\times c)$ for any three integers a,b and c.

- Under addition and multiplication, integers show a property called distributive property. That is, $a\times(b+c)=a\times b+a\times c$ for any three integers a,b and c.
- The properties of commutativity, associativity under addition and multiplication, and the distributive property help us to make our calculations easier.
- We also learnt how to divide integers. We found that,

  (a) When a positive integer is divided by a negative integer, the quotient obtained is a negative integer and vice-versa.

  (b) Division of a negative integer by another negative integer gives a positive integer as quotient.

- For any integer a, we have

  (a) $a\div 0$ is not defined

  (b) $a\div 1=a$