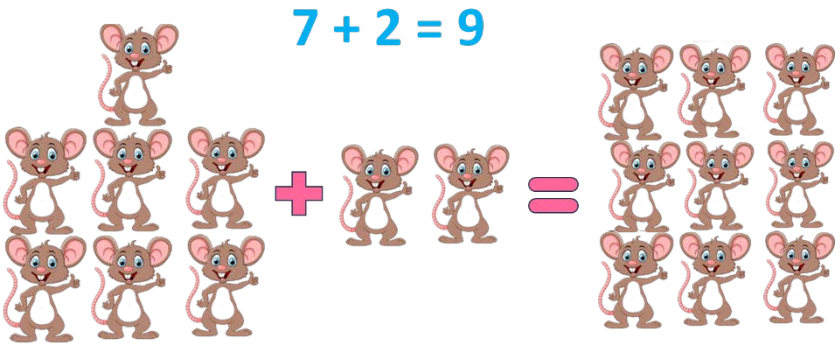
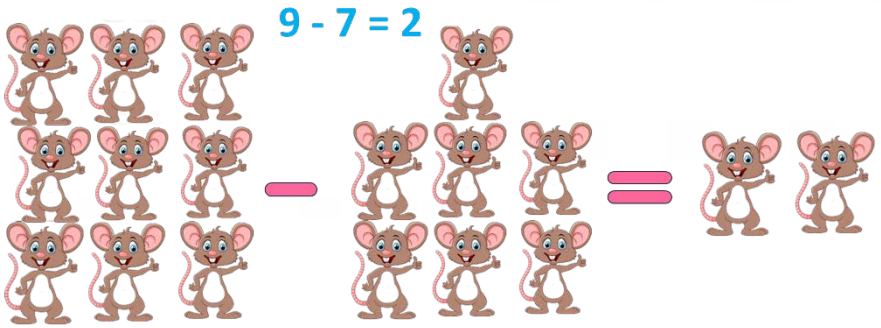
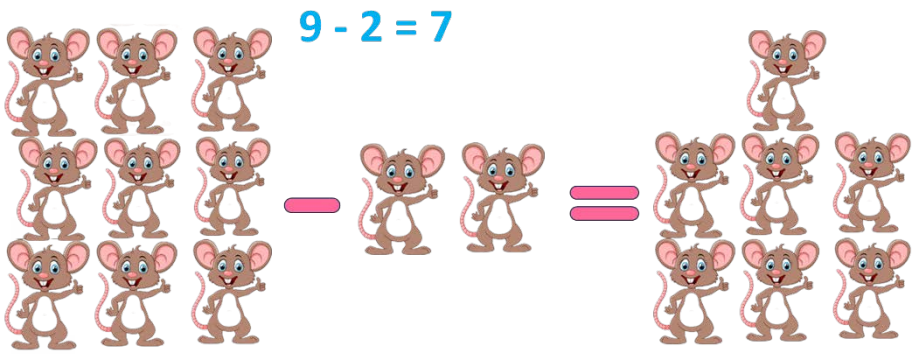
Subtraction on Number Line

Subtraction is an inverse process of addition.

Example: (7 + 2 = 9) ⇒ (9 – 7 = 2)







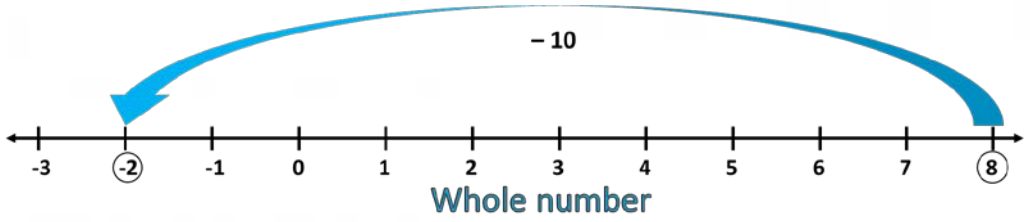
i) **Closure Property:**

a, b whole numbers	If a > b or a = b then a – b, Whole number
	If a < b then a – b, not a whole number

If a and b are two whole numbers such that a > b or a = b, then a – b is a whole number.

If a < b, then a – b is not a whole number.

a	b	a – b	Whole number
9	7	9 – 7 = 2	Yes
8	10	8 – 10 = Not a whole number	No
10	27	10 – 27 = Not a whole number	No



The whole numbers are not closed under subtraction.

ii) Commutative Property:

a, b Whole numbers ⇒ a – b ≠ b – c

If a and b are two whole numbers, then a – b ≠ b – a

a	b	a – b	b – a	Is a – b = b – a?
11	7	11 – 7 = 4	7 – 11 = Not a whole number	No
18	11	18 – 11 = 7	11 – 18 = Not a whole number	No
13	25	13 – 25 = Not a whole number	25 – 13 = 12	No

iii) Associative Property:

a, b and c Whole numbers ⇒ (a – b) – c ≠ (a – b) – c

For ant three whole numbers a, b and c

(a – b) – c ≠ a – (b – c)

a	b	c	(a – b) – c	a – (b – c)	Is (a – b) – c = a – (b – c)?
10	7	5	(10 – 7) – 5 = Not a whole number	10 – (7 – 5) = 8	No
5	6	21	(5 – 6) – 21 = Not a whole number	5 – (6 – 21) = 20	No
8	25	5	(8 – 25) – 5 = Not a whole number	8 – (25 – 5) = Not a whole number	No

iv) If a is any whole number other than zero, then a – 0 = a but 0 – a is not defined.

a is a Whole number ⇒ a – 0 = a, 0 – a is not defined

18 – 5 = 13 but 5 – 18 is not defined in whole numbers.

30 – 12 = 18 but 12 – 30 is not defined in whole numbers

v) If a, b and c are whole numbers such that a – b = c, then b + c = a

a , b and c Whole numbers ⇒ a – b = c, b + c = a

a – b = c

Transposing b to RHS

a = c + b or a = b + c

If 25 – 16= 9 then 25 = 9 + 16,

If 46 – 8 = 38 then 46 = 38 + 8

Example: Consider two whole numbers p and q such that p is greater than q.

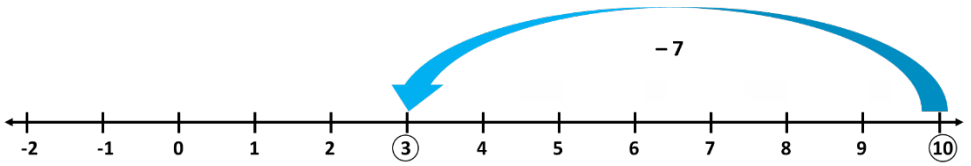
i) Is p-q a whole number? Is the result always true?

ii) Is q-p a whole number? Is the result always true?

i) Yes, p-q is a whole number is always true for p > q.

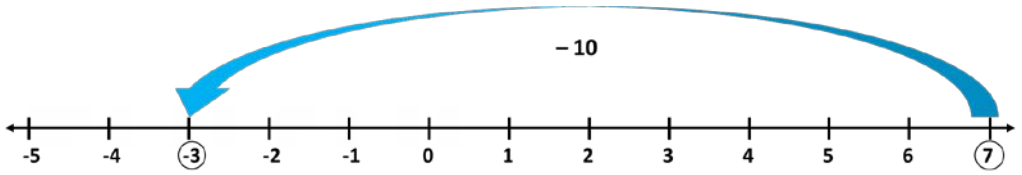
ii) No, q – p is not a whole number is always true for p > q.

Let the value of p and q be 10 and 7 respectively.



Whole numbers

p – q = 10 – 7 =3, a whole number



q – p=7 – 10 not a whole number

Example: Solve the following,

i) 367 – 99

=367+(–100+1)

= 367 – 100+ 1

= (367 +1)– 100

=368 –100 = 268