Number Line

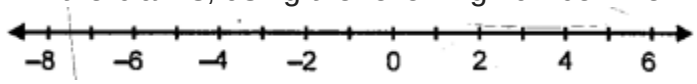
IMPORTANT POINTS

1. **Number Line:** A Number line is used to represent numbers, such as : fractions, whole numbers, integers, etc.
2. **Using A Number Line to Compare Numbers:** Out of any two numbers, marked on a number line, the number which is on the right of the other number is greater and the number which is on the left of the other number is lesser (smaller).

EXERCISE 7(A)

Question 1.

Fill in the blanks, using the following number line :



(i) An integer, on the given number line, is …… than every number on its left.
(ii) An integer, on the given number line, is greater than every number to its ……..
(iii) 2 is greater than – 4 implies 2 is to the …….. of – 4.
(iv) -3 is …….. than 2 and 3 is ……. than – 2.
(v) – 4 is …….. than -8 and 4 is …… than 8.
(vi) 5 is ……. than 2 and -5 is …… than – 2.
(vii) -6 is ……. than 3 and the opposite of -6 is …… than opposite of 3.
(viii) 8 is ……. than -5 and -8 is …….. than -5.

Solution:

(i) An integer, on the given number line, is **greater** than every number on its left.
(ii) An integer, on the given number line, is greater than every number to its **left**.
(iii) 2 is **greater** than – 4 implies 2 is on the **right** of – 4.
(iv) – 3 is **less than** 2 and 3 is **greater** than -2.
(v) – 4 is **greater** than -8 and 4 is **less** than 8.
(vi) 5 is **greater** than 2 and – 5 is **less** than – 2.
(vii) -6 is **less** than 3 and the opposite of -6 is **greater** than opposite of 3.
(viii) 8 is **greater** than -5 and -8 is **less** than -5.

Question 2.

In each of the following pairs, state which integer is greater :
(i) -15, -23
(ii) -12, 15
(iii) 0, 8
(iv) 0, -3

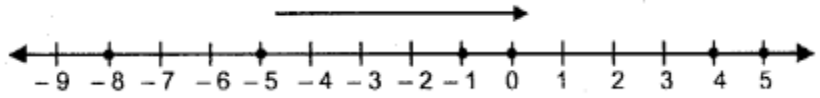
Solution:

(i) -15, -23
-15 is greater than -23 as -15 lies on the right side of-23 on the number line
(ii) -12, 15
15 is greater than than -12 as 15 lies on the right side of -12 on the number line
(iii) 0, 8 $8 > 0$
(iv) 0, -3 $0 > -3$

Question 3.
In each of the following pairs, which integer is smaller :
(i) o, -6
(ii) 2, -3
(iii) 15, -51
(iv) 13, 0
Solution:
(i) 0, -6
-6 < 0
(ii) 2, -3
-3 < 2
(iii) 15, -51
-51 < 15
(iv) 13, 0
0 < 13

Question 4.
In each of the following pairs, replace * with < or > to make the statement true:
(i) 3 * 0
(ii) 0 * -8
(iii) -9 * -3
(iv) 3 * 3
(v) 5 * -1
(vi) -13 * 0
(vii) -8 * -18
(viii) 516 * -316
Solution:
(i) 3 > 0
(ii) 0 > -8
(iii) -9 < -3
(iv) -3 < 3
(v) 5 > -1
(vi) -13 < 0
(vii) -8 > -18
(viii) 516 > -316

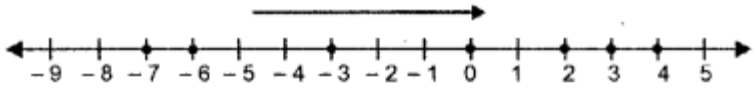
Question 5.
In each case, arrange the given integers in ascending order using a number line.
(i) – 8, 0, – 5, 5, 4, – 1
(ii) 3, – 3, 4, – 7, 0, – 6, 2
Solution:
(i) – 8, 0, – 5, 5, 4, – 1
Draw a number line and mark the numbers on it. Arranging in ascending order, as shown -8,-5,-1, 0, 4, 5 as on the number line



(ii) 3, -3, 4, -7, 0, -6, 2

Draw the number line and mark the numbers on it. Arranging in ascending order as shown on the number line.

-7, -6, -3, 0, 2, 3, 4



Question 6.

In each case, arrange the given integers in descending order using a number line.

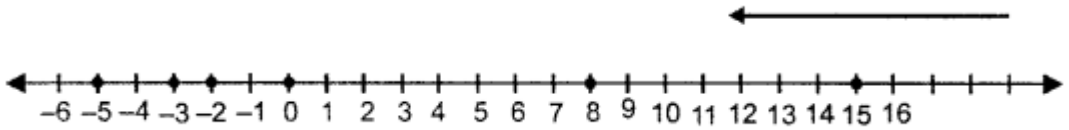
(i) -5, -3, 8, 15, 0, -2

(ii) 12, 23, -11, 0, 7, 6

Solution:

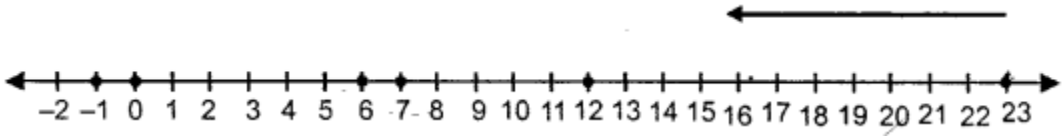
(i) -5, -3, 8, 15, 0, -2

Draw the number line and mark these numbers on it. Arranging in descending order 15, 8, 0 -2, -3, -5 as shown on the number line



(ii) 12, 23, -11, 0, 7, 6

Draw a number line and mark these numbers on it. Arranging in descending order. 23, 12, 7, 6, 0, -1 as shown on the number line



Question 7.

For each of the statements, given below, state whether it is true or false :

(i) The smallest integer is 0.

(ii) The opposite of -17 is 17.

(iii) The opposite of zero is zero.

(iv) Every negative integar is smaller than 0.

(v) 0 is greater than every positive integer.

(vi) Since, zero is neither negative nor positive ; it is not an integer.

Solution:

(i) False

(ii) True

(iii) True

(iv) True

(v) False
(vi) False

EXERCISE 7(B)

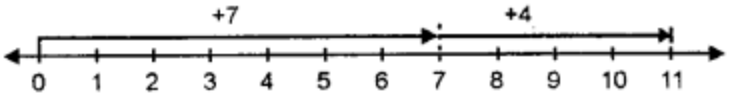
Use a number line to evaluate each of the following :

Question 1.

(i) (+ 7) + (+ 4)
(ii) 0 + (+ 6)
(iii) (+ 5) + 0

Solution:

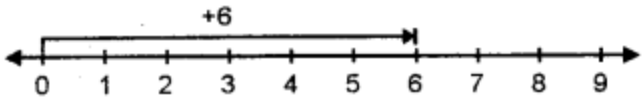
(*i*) (+ 7) + (+ 4)



For + 7, move 7 units to the right of zero and for + 4 move 4 units to the right of +7

$\therefore$ (+ 7) + (+ 4) = **+ 11**

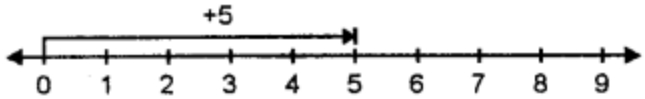
(*ii*)



For 0, No movement for + 6 move 6 units right to zero.

$\therefore$ (0) + (+ 6) = **+ 6.**

(*iii*)



For + 5 move 5 units to the right of 0, for 0 Nor movement.

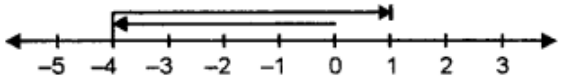
$\therefore$ (+ 5) + 0 = **+ 5.**

Question 2.

(i) (-4) + (+5)
(ii) 0 + (-2)
(iii) (-1) + (-4)

Solution:

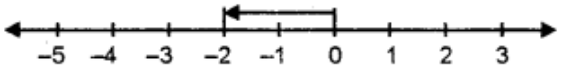
(*i*) (– 4) + (+ 5)



For (– 4) move 4 units to the left of 0, then for + 5 move 5 units to the right of – 4

∴ (– 4) + (+ 5) = **+ 1.**

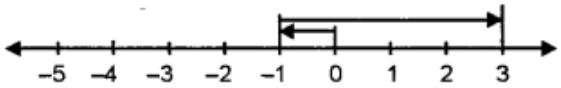
(*ii*) 0 + (– 2)



For 0 no movement then for – 2 move 2 units to left of 0

∴ 0 + (– 2) = **– 2.**

(*iii*) (– 1) + (+ 4)



For – 1 move 1 unit to the left of 0, then for + 4 move 4 units to the right of – 1 ∴ (– 1) + (+ 4) = **+ 3.**

Question 3.

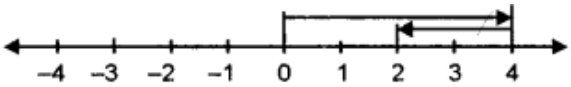
(i) (+ 4) + (-2)

(ii) (+3) + (-6)

(iii) 3 + (-7)

Solution:

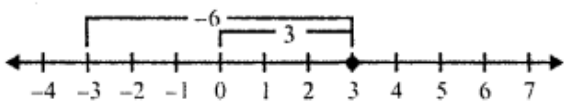
(*i*) (+ 4) + (– 2)



For + 4 move 4 units to the right of 0, then for (– 2) move 2 units to the left of + 4

∴ (+ 4) + (– 2) = **+ 2.**

(*ii*) (+3) + (–6)

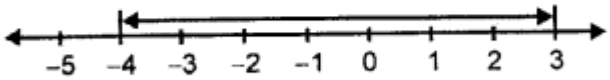


For (+3), we move 3 unit right of 0 and then

For (–6), we move 6 units left of 3, we get –3

∴ (+3) + (–6) = –3

(*iii*) 3 + (– 7)



For 3, we move 3 units right of 0 and then, for (– 7) move 7 units to left of 3.

∴ 3 + (– 7) = **– 4.**

Question 4.

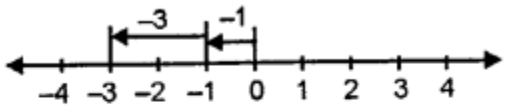
(i) (-1) + (-2)

(ii) (-2) + (-5)

(ii) (-3) + (-4)

Solution:

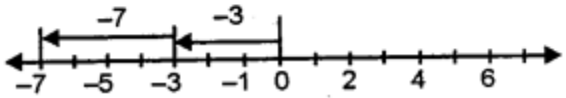
(*i*) (– 1) + (– 2)



for – 1, start from zero and move one units to the left and then again for – 2, move 2 unit to left of – 1.

∴ (– 1) + (– 2) = – 3.

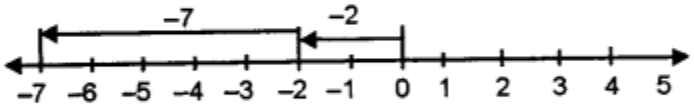
(*ii*) (– 3) + (– 4)



for – 3, start from zero and move 3 units to the left and then again for – 4, move 4 unit to left of – 3.

∴ (– 3) + (– 4) = – 7.

(*iii*) (– 2) + (– 5)



for – 2, start from zero and move 2 units to the left and then again for – 5, move 5 unit to left of – 2.

∴ (– 2) + (– 5) = – 7.

Question 5.

(i) (+ 10) – (+2)

(ii) (+8)- (-5)

(iii) (-6) – (+2)

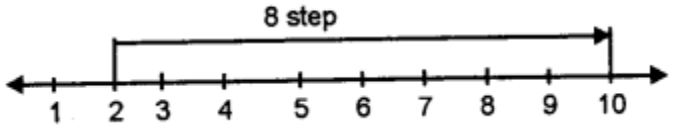
(iv) (-7) – (+5)

(v) (+4) – (-2)

(vi) (-8) – (-4)

Solution:

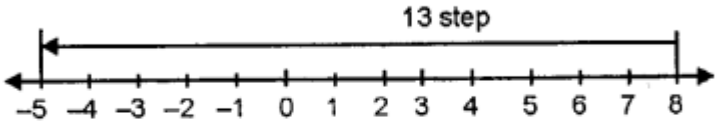
(*i*) (+ 10) – (+ 2)



From + 2, to reach the position of number + 10, we find 8 steps to the rights.

∴ (+ 10) – (+ 2) = + **8**

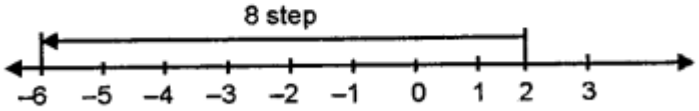
(*ii*) (+ 8) – (– 5)



Starting from the position of – 5, count the number of steps needed to reach + 8, we find 13 steps towards right.

∴ (+ 8) – (– 5) = + **13**

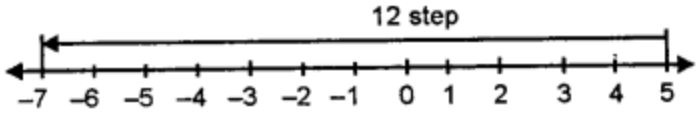
(*iii*) (– 6) – (+ 2)



Marking the position of 6, and + 2 on the number line count step from position + 2 to left – 6, there are 8 steps

∴ (– 6) – (+ 2) = – **8**

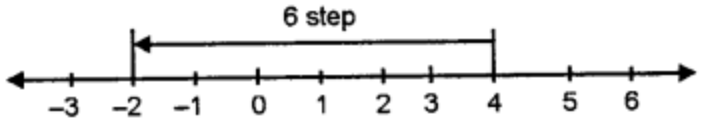
(*iv*) (– 7) – (+ 5)



Marking – 7 and + 5, form + 5 position count steps towards left to – 7, there are 12 steps

∴ (– 7) – (+5) = **– 12**

(*v*) (+ 4) – (– 2)

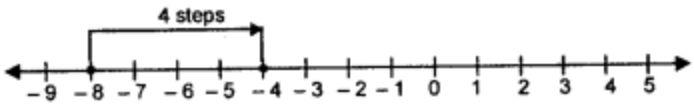


Marking (+ 4) (– 2) from + 4 position count steps toward left to 2. There are 6 steps.

∴ (+ 4) – (– 2) = **+ 6**

(*vi*) (–8) – (–4)

Draw a number line and mark (–8) on it. Now mark (–4) on the same line. Now count from –8 to –4, which is –4 as shown.



Question 6.

Using a number line, find the integer which is :

(i) 3 more than -1

(ii) 5 less than 2

(iii) 5 more than -9

(iv) 4 less than -4

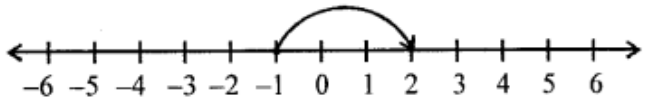
(v) 7 more than 0

(vi) 7 less than -8

Solution:

(i) 3 more than –1

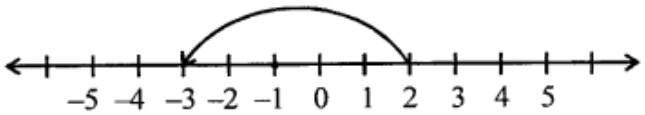
To get 3 more than –1, start from –1 and than move 3 units to the right of –1 to get 2.



∴ 3 more than –1 is 2

(ii) 5 less than 2

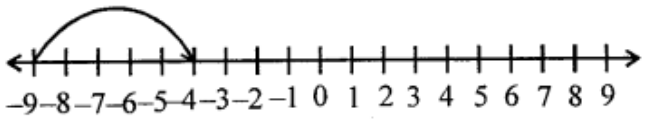
To get 5 less than 2, start from 2 and then move 5 units to the left of 5 to get –3.



∴ 5 more than 2 is –3

(iii) 5 more than –9

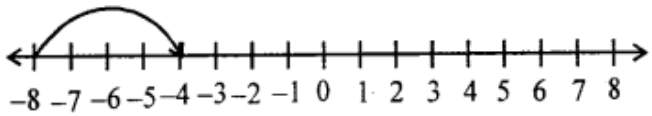
To get 5 more than –9, start from –9 and then move –9 units to the right of –9 to get –4.



∴ 5 more than –9 is –4

(iv) 4 less than –4

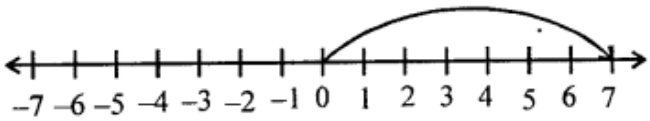
To get 4 less than –4, start from –4 and then move 4 units to the left of 4 to get –8.



∴ 4 less than –4 is –8

(v) 7 more than 0

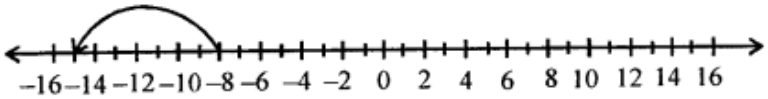
To get 7 more than 0, start from 7 and then move 7 and then move 7 units to the right of 7 to get 7.



∴ 7 more than 0 is 7

(vi) 7 less than –8

To get 7 less than –8, start from –8 and then move 7 units to the left of –8 to get –15.



∴ 7 less than –8 is –15

REVISION EXERCISE

Question 1.

Fill in the blanks :

(i) 5 is …… than -2 and -5 is …… than 2.
(ii) -3 is …… than 0 and 3 is …… than 0.
(iii) on a number line, if x is to the left of y, then x is …… than y.
(iv) on a number line if x is to the right of y, then y is …… than x.

Solution:

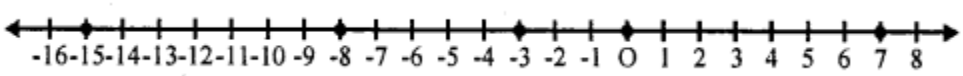
(i) 5 is **greater** than -2 and -5 is **less** than 2.
(ii) -3 is **less** than 0 and 3 is **greater** than 0.
(iii) On a number line, if x is to the left of y, then x is **less** than y.
(iv) On a number line, x is to the right of y, then y is **less** than x.

Question 2.

Using a number line, write the numbers -15, 7, 0, -8 and -3 in ascending order of value.

Solution:

On the given number line, we mark the numbers -15, 7, 0, -8 and -3 on it, we see that



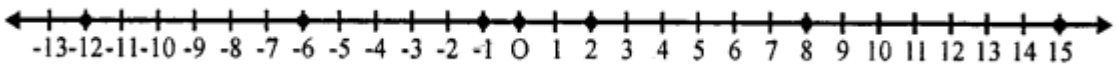
We see that -15 < -8 < -3 < 0 < 7
-15, -8, -3, 0, 7 are in ascending order

Question 3.

Using a number line, write the numbers 8, -6, 2 -12, 0, 15 and -1 in descending order of value.

Solution:

On the given number line, we mark the numbers 8, -6, 2, -12, 0, 15 and -1 on it



We see that
15 > 8 > 2 > 0 > -1 > -6 > -12
15, 8, 2, 0, -1, -6, -12 are in descending order

Question 4.

Using a number line, evaluate :

(i) (+5) + (+4)
(ii) (+6) + (+8)
(iii) (-3) + (+5)
(iv) (-3) + (+7)
(v) (+6) + (-2)
(vi) (-3) + (+3)
(vii) (-5) + (-5)
(viii) (-7) + (-1)

(ix) (+6) – (+2)
(x) (+5) – (-3)
(xi) (+4) – (-1)
(xii) (-7) – (-2)

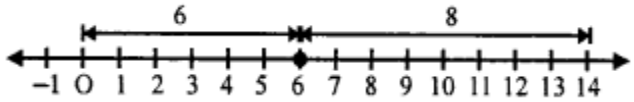
Solution:

(i) (+5) + (+4)

First of all, we move 5 units to the right of zero then for (+4), move 4 units right of 5, then we reach at 9, then

(+5) + (+4) = +9

(ii) (+6) + (+8)

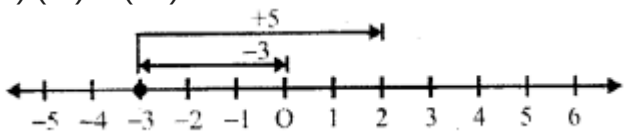


First of all, we move 6 units to the right of zero then for (+8), we move 8 units to the right of (+6)

Then we reach at +14, then

(+6) + (+8) = +14

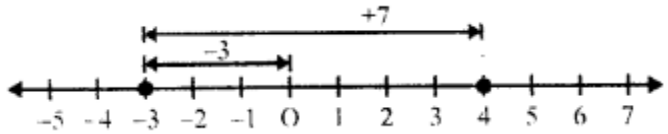
(iii) (-3) + (+5)



First of all for (-3) we move, 3 units to the left of zero, then move (+5) units to the right of 5, then we reach at (+2), then

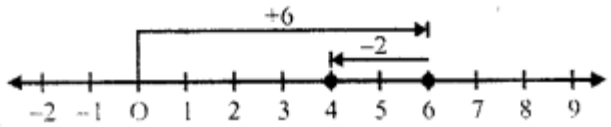
(-3) + (+5) = -3 + 5 = 2

(iv) (-3) + (+7)



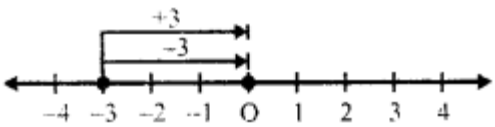
First of all, we move for (-3) 3 unit to the left of zero and then for (+7), we move 7 units to the right of (-3) reaching +4 Then (-3) + (+7) = +4

(v) (+6) + (-2)

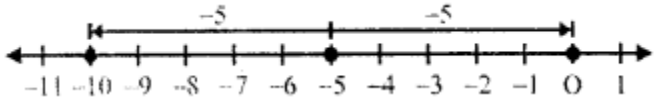


First of all, we move for (+6), 6 units to the right of zero and then for (-2), move 2 units to the left of 6, then we reach 4 Then (+6) + (-2) = 6 – 2 = 4

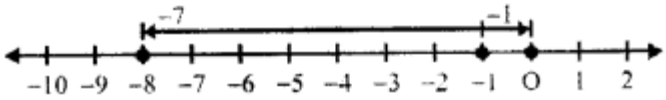
(vi) (-3) + (+3)



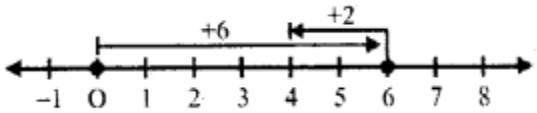
First of all for (-3), we move 3 units left of zero and then for (+3) we move 3 unit right of (-3) reaching at 0
So, (-3) + (+3) = 0
(vii) (-5) + (-5)



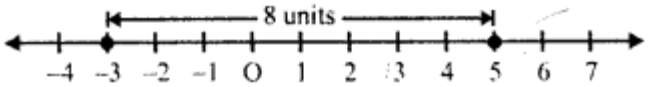
First of all for -5, we move 5 units to left of zero and then for (-5), we move 5 units to left of (-5) reaching at -10
(-5) +(-5) = -10
(viii) (-7) + (-1)



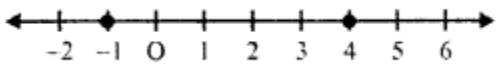
First of all for -7, we move 7 units left of zero and then for (-1) we move 1 unit left of -7 reaching -8
(-7) + (-1) = -8
(ix) (+6) – (+2)



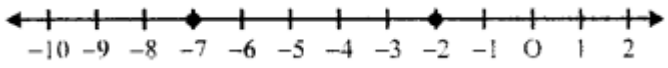
First of all for (+6) we move 6 units right of 0 and then for (+2), we move 2 units left of 6 reaching 4
(+6)-(+2) = 6 – 2 = 4
(x) (+5) – (-3)



Mark the points (+5) and (-3) on the same number line. We see that the position of (-3) is 8 units from (+5) to its right 3.
(+5) – (-3) = 5 + 3 = 8
(xi) (+4) – (-1)



Mark the points (+4) and (-1) on the same number line, we see that the position of (-1) is 5 units from (+4) to its right
(+4) – (-1) = 4 + 1 = 5
(xii) (-7) – (-2)



Mark the points (-7) and (-2) on the same number line, we see that (-2) is 5 units on the left (-2)
-7 – (-2) = -7 + 2 = -5