NCERT
Exercises & Exemplar Problems

NCERT Exercises (Questions-Solutions)

Exercise 6.1

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1. **Write opposites of the following:**
(a) Increase in weight **(b) 30 km North** **(c) 326 BC** **(d) Loss of Rs. 700**
(e) 100 m above sea level

Sol. (a) Opposite of increase in weight is **decrease in weight.**
(b) Opposite of 30 km North is **30 km South.**
(c) Opposite of 326 EC is **326 AD.**
(d) Opposite of loss of Rs. 700 is **profit of Rs. 700.**
(e) Opposite of 100 m above sea level is **100 m below** sea level.

2. **Represent the following numbers as integers with appropriate signs.**
(a) An aeroplane is flying at a height of two thousand metre above the ground.
(b) A submarine is moving at a depth, eight hundred metre below the sea level.
(c) A deposit of rupees two hundred.
(d) Withdrawal of rupees seven hundred.

Sol. (a) An aeroplane is flying at a height of two thousand metre above the ground can be written as + 2000 m because height above the ground is taken as positive.
(b) A submarine is moving at a depth eight hundred metre below the sea level can be written as – 800 m because depth below the sea level is taken as negative.
(c) A deposit of rupees two hundred can be written as + Rs. 200 because deposit is represented with + sign.
(d) Withdrawal of rupees seven hundred can be written as – Rs. 700 because withdrawal is represented with - sign.

3. **Represent the following numbers on a number line:**
**(a)+5** **(b) – 10** **(c)+8** **(d) – 1**
(e)– 6

> **TIPS**
> Firstly, draw a number line, then represent a negative integer on the left of zero on the number line and a positive integer on the right of zero on the number line.

Sol. Draw a line and mark some points at equal distance on it. Mark a point as zero on it. Points to the right of zero are positive integers and are marked by +1, +2, +3 or simply by 1, 2, 3, etc. Points to the left of zero are negative integers and are marked by –1, –2, –3, etc.
(a) Representation of + 5 To mark + 5 on number line, we move 5 points to the right of zero as shown in the figure.
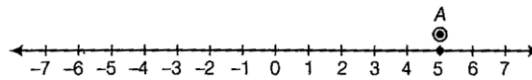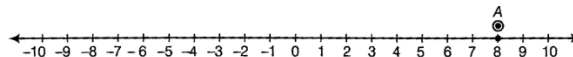
In the above figure, point *A* represents +5.

(b) **Representation of– 10** To mark – 10 on number line, we move10 points to the left of zero as shown in the figure.
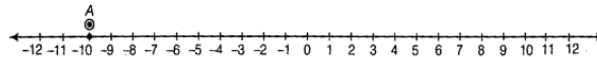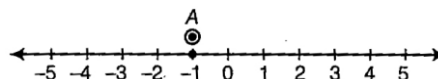

In the above figure, point A represents – 10.

(c) **Representation** of +8 To mark +8 on number line, we move8 points to the right of zero as shown in the figure.
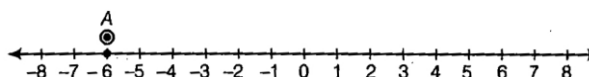

In the above figure, point A represents +8.

(d) **Representation of −1**To mark −1on number line, we move1 point to the left of zero as shown in the figure.

In the above figure, point A represents −1.

(e) **Representation of −6**To mark −6 on number line, we move6 points to the left of zero as shown in the figure.

In the above figure, point A represents −6.

4. **Adjacent figure is a vertical number line, representing integers. Observe it and locate thefollowing points.**
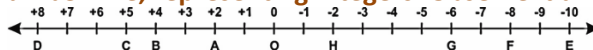
(a) If point D is + 8, then which point is –8?
(b) Is point G, a negative integer or a positiveinteger?
(c) Write integers for points B and E.
(d) Which point marked on this number line has the least value?
(e) Arrange all the points in decreasing order of value?

> **TIPS**
> Positive integers are represented on the right of zero and negative integers are represented on the left of zero on a number line but here vertical line is given. So, positive integers will berepresented abovezero and negative integers will be represented below zero on vertical number line.

Sol. (a) Now, from figure, it is clear that +8 is on point D, then for getting –8, we should move below to 0.
After moving 8 steps below 0, we reach at point F.
So, point F represents –8.
(b) We know that, points lie above zero are positive integers andlie below zero are negative integers.
Here, we see that point G lies below zero.
So, G is a negative integer.
(c) On given number line, point B lies above zero and point E liesbelow zero.
So, it is clear that point B is a positive integer and point E is anegative integer. Now, counting from 0, the distance of $B = +4$ units because it is on right of zero and counting from 0, thedistance of $E = -10$ units because it is on left of zero.
$\therefore$ Integer $B = +4$ and Integer $E = -10$

(d) Here, we see that the distance of point E is far from 0 andbelow from 0 and we know that on vertical number line belowfrom 0 the value of integers are negative.
Hence, point E has the least value.
(e) We know that, on a number line the number decreases as wemove to left. Here, vertical number line is given to us, so thenumber decreases as we move to down. So, decreasing order ofvalues of all points is given here.

$$D, C, B, A, O, H, G, F, E$$

5. **Following is the list of temperatures of five places inIndia on a particular day of the year:**

Place	Temperature	
Siachin	$10^{o}C$ below $0^{o}C$	....
Shimla	$2^{o}C$ below $0^{o}C$	....
Ahmedabad	$30^{o}C$ above $0^{o}C$	....
Delhi	$20^{o}C$ above $0^{o}C$	....
Srinagar	$5^{o}C$ below $0^{o}C$	....

(a) Write the temperatures of these places inthe form ofintegers in the blank column.
(b) Following is the number line representing thetemperature in degree Celsius

Plot the name of the city against its temperature.
(c) Which is the coolest place?
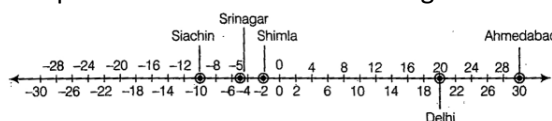**(d) Write the names of the places, where temperature areabove $10^{o}C$.**

TIPS
Temperature below $0^{o}C$ is denoted with negative (-) sign andtemperature above $0^{o}C$ is denoted with positive (+) sign.

Sol. (a)

Place	Temperature	Form of integers
Siachin	$10^{o}C$ below $0^{o}C$	$-10^{o}C$
Shimla	$2^{o}C$ below $0^{o}C$	$-2^{o}C$
Ahmedabad	$30^{o}C$ above $0^{o}C$	$+30^{o}C$
Delhi	$20^{o}C$ above $0^{o}C$	$+20^{o}C$
Sringar	$50^{o}C$ below $0^{o}C$	$-5^{o}C$

(b) The name of city against its temperature on the number line isgiven below

(c) After checking the temperature of all places, we can say that theSiachin $(-10^{o}C)$ is the coolest place.

(d) Delhi $(+20^{o}C)$ and Ahmedabad $(+30^{o}C)$ are the places, wheretemperature is above $10^{o}C$.

6. **In each of the following pairs, which number is to the right of the other on the number line?**
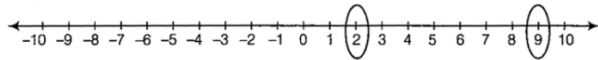**(a) 2, 9**   **(b) –3, –8**   **(c) 0, –1**   **(d) –11,10**
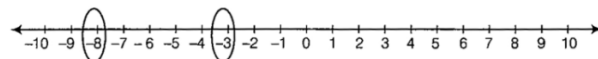**(e) –6,6**   **(f) 1, –100**
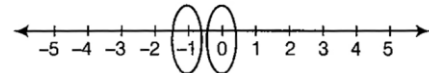
Sol. (a)

Here, 2 and 9 both are on the right of zero but 9 is farther from zero in comparison of 2. So, number 9 is right of number 2.
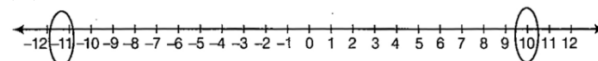
(b)

Here, –3 and –8 both are on the left of zero but –3 is near to the zero in comparison of –8. So, –3 is to the right of –8.
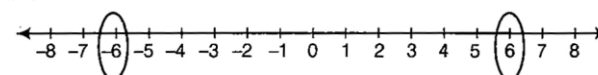
(c)

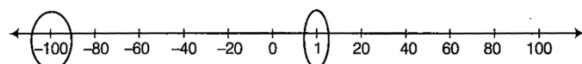Here, –1 is on the left of zero, so we can say that 0 is to the right of –1.

(d)

Here, –11 is to the left of zero and 10 is on the right of zero. So,10 is to the right of –11.

(e)

Here, –6 is to the left of zero and 6 is to the right of zero. So, we can say that 6 is to the right of –6.

(f)

Here, –100 is to the left of zero and 1 is to the right of zero. So,we can say that 1 is to the right of –100.

7. **Write all the integers between the given pair (write them in the increasing order).**
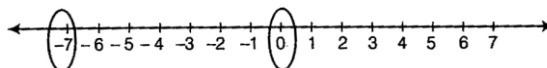**(a) 0 and –7**   **(b) –4 and 4**   **(c) –8 and –15**   **(d) –30 and –23**

> **TIPS**
> We know that on a number line, the number increases as we move to the right and decreases as we move to the left. Here, for increasing order of integers, we will move to the right on number line.

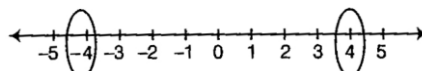**Sol.** (a) Integer 0 and –7 are on number line are shown as below

From the above figure, it is clear that integers between 0 and –7 are –1, –2, –3, –4, –5 and –6.
Now, increasing order of these integers is
–6 <–5 <–4 <–3 <–2 <–1, because we are moving to the right from –7 to 0.
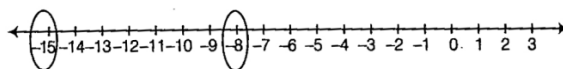(b) Integers –4 and 4 on number line are shown as below

From the above figure, it is clear that integers between –4 and 4 are –3, –2, –1,0,1,2 and 3.

Now, increasing order of these integers is

−3<−2<−1<0<1<2<3 because we are moving to the rightfrom −4 to 4.

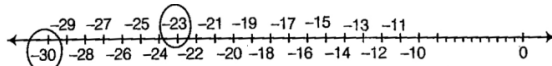(c) Integers −8 and −15 on the number line are shown as below

From the above figure, it is clear that integers between −8 and−15 are −9, −10, −11, −12, −13 and −14

Now, increasing order of these integers is

−14<−13<−12<−11<−10<−9,

because we are moving to the right from −15 to −8.

(d) Integers −30 and −23 on the number line are shown as below

From figure, it is clear that integers between

−30 and −23 are

−24, −25 −26, −27, −28 and −29.
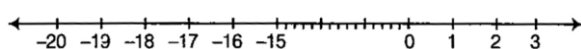
Now, increasing order of these integers is

−29<−28<−27<−26<−25<−24,

because we are moving to the right from −30 to −23.

8. **(a) Write four negative integers greater than–20.**
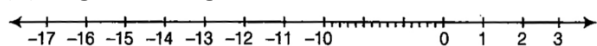   **(b) Write four negative integers less than −10.**

Sol. (a) Negative integers greater than −20 on number line are shownas below

When we move on number line to the right, then the value ofinteger increases.

So, it is clear from figure that when we move right of −20, wewill get integers greater than −20. So, four negative integers greater than   −20 are −19, −18, −17 and −16.

(b) Negative integers which are less than −10 on number line areshown as below

When we move on number line to the left, then the value ofinteger decreases.

So, it is clear from the above figure that when we move left of−10, we will get integers less than of −10.

So, four negative integers less than −10 are   −11, −12, −13 and−14.

9. **For the following statements, write True (T) or False(F). If the statement is false, correct the statement.**
    (a) −8 is to the right of −10 on a number line.   (b) −100 is to the right of −50 on a number line.
    (c) Smallest negative integer is −1.   (d) −26 is greater than −25.

Sol. (a) True, because on number line going to the right, value ofinteger is increases. Here, −8 is greater to −10, so −8 is to theright of −10 on number line.

(b) False, because on number line going to the left, value of integeris decreases. Here, −100 is less than −50. So, −100 is to the leftof −50 on number line.

(c) False, because on number line −1 is situated on the right of allnegative integers. So, it is the greatest negative integer.

(d) False, because on number line −25 is on the right of −26. So, −25is greater than −26.

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10. **Draw a number line and answer the following:**
     (a) Which number will we reach if we move 4 numbers tothe right of–2.

(b) Which number will we reach if we move 5 numbers to the left of 1.

(c) If we are at −8 on the number line, in which direction should we move to reach   −13?

(d) If we are at −6 on the number line, in which direction should we move to reach −1?
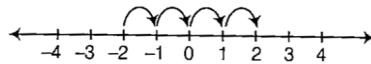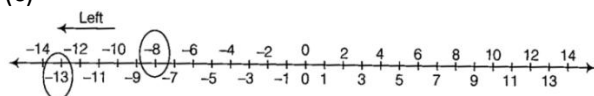

Sol. (a) On number line, starting from −2 and moving 4 points towards right (each step being equal to 1 unit), we will reach at 2.

(b) On number line, starting from 1 and moving 5 points towards left (each step being equal to 1 unit), we will reach at −4.
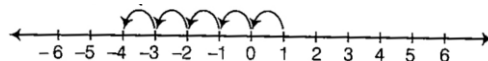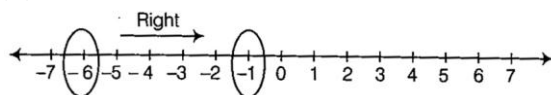

(c)

Here, −8 >−13. So, −13 is on the left of −8. Hence, if we are at −8 on number line, then move to the left from −8 to reach at −13.

(d)

Here, −1 >−6. So, −1 is on the right of −6. Hence, if we are at −6 on the number line, then move to the right from −6 to reach at −1.

Exercise 6.2

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1. **Using the number line write the integer which is**
(a) 3 more than 5   **(b) 5 more than −5**   **(c) 6 less than 2**   **(d) 3 less than −2**

> **TIPS**
> To find a number more than given number, we move to right of that given number and to find a number less than given number, we move to left of that number.

Sol. (a) To get the integer 3 more than 5, we start from 5 and move 3 steps to the right of 5 and reach at 8, as shown in the figure given below
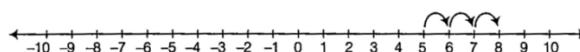
Hence, 3 more than 5 is 8.

(b) To get the integer 5 more than −5, we start from −5 and move 5 steps to the right of −5 and reach at 0, as shown in the figure given below
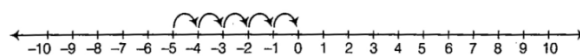
Hence, 5 more than −5 is 0.

(c) To get the integer 6 less than 2, we start from 2 and move 6 steps to the left of 2 and reach at −4, as shown in the figure given below

Hence, 6 less than 2 is –4.

(d) To get the integer 3 less than –2, we start from –2 and moves 3 steps to the left of –2 and reach at –5, as shown in the figure given below

Hence, 3 less than –2 is –5.

2. **Use number line and add the following integers**
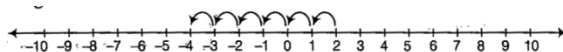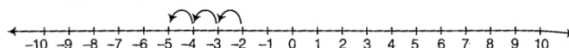**(a) 9 + (–6)**　　　　**(b) 5 + (–11)**　　　　**(c) (–1) + (–7)**　　　　**(d) (–5) + 10**
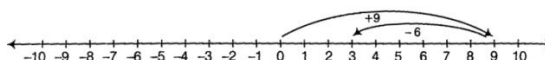**(e) (–1) + (–2) + (–3)**　　**(f) (–2) + 8 + (–4)**

> **TIPS**
> Firstly, draw the number line and represent first number on it. Now, to add second number in first number, we move right to the first number, if second number is positive and move left to the first number, if second number is negative.
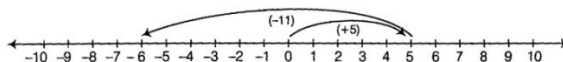
Sol.　(a) We have, 9 + (–6)

Firstly, draw a number line, then, we move 9 steps to the right of 0 and reach at 9. Now, we move 6 steps to the left of 9 [$\because$ –6 is a negative integer] and reach at 3, as shown in the above figure.
Hence, 9 + (–6) = 3

(b) We have, 5 + (–11)

Firstly, draw the number line, then we move 5 steps to the right of 0 and reach at 5. Now, we move 11 steps to the left of 5 [$\because$ –11 is a negative integer] and reach at –6, as shown in the above figure. Hence, 5 + (–11) = –6

(c) We have, (–1) + (–7)
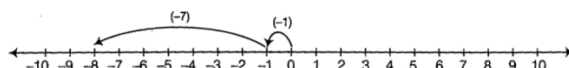
Firstly, draw the number line, then we move one step to the left of 0 (zero) and reach at –1. Now, we move 7 steps to the left of –1 [$\because$ –7 is a negative integer] and reach –8, as shown in the above figure. Hence, (–1) + (–7) = –8

(d) We have, (–5) + 10
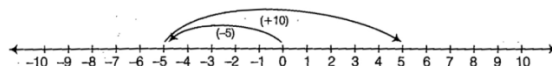
Firstly, draw the number line, then we move 5 steps to the left of 0 and reach at –5. Then, we move 10 steps to the right of –5 [$\because$ 10 is a positive integer] and reach at 5, as shown in the above figure. Hence, (–5) + (+10) = 5

(e) We have, (–1) + (–2) + (–3)
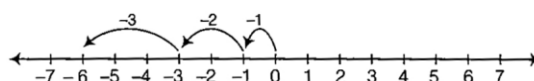
Firstly, draw the number line, then we move one step to the left of 0 and reach at –1. Now, we move 2 steps to the left of –1 [$\because$ –2 is a negative integer] and reach at –3. Then, we move 3 steps to the left of –3 [$\because$ –3 is a negative integer] and reach at -6, as shown in the above figure.
Hence, (–1) + (–2) + (–3) = (–6)

(f) We have, $(-2) + 8 + (-4)$

Firstly, draw the number line, then we move 2 steps to the left of 0 and reach at −2. Now, we move 8 steps to the right of −2[∵ 8 is a positive integer] and reach at 6. Again, from 6, we move 4 steps to the left of 6 [∵ −4 is a negative integer] and reach at 2, as shown in the above figure.
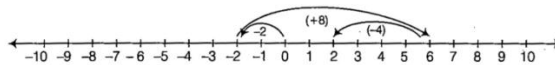Hence, $(-2)+(8)+(-4) = 2$

3. **Add without using number line:**
   (a) 11+(−7)　　　　**(b) (−13) + (+18)**　　　　**(c) (−10) + (+19)**　　　　**(d) (−250) + (+150)**
   (e) (−380) + (−270)　　**(f) (−217) + (−100)**

Sol. (a) We have, $11+(-7) = (+4)+(+7)+(-7)$
$[\because 11 = 4+7] = (+4)+(0) = 4$
$[\because (+7)+(-7) = 0]$
(b) We have,
$(-13)+(+18) = (-13)+(+13)+(5)$
$[\because 18 = 13+5]$
$= 0+(+5) = 5$
$[\because (-13)+(+13) = 0]$
(c) We have,
$(-10)+(+19) = (-10)+(+10)+(9)$
$[\because 19 = 10+9]$
$= 0+(+9) = 9$
$[\because (-10)+(+10) = 0]$
(d) We have,
$(-250)+(+150) = (-150)+(-100)+(+150)$
$[\because 250 = 150+100 \Rightarrow -250 = -150+(-100)]$
$= (-150)+(+150)+(-100)$
$= 0+(-100) = -100 [\because (-150)+(=150) = 0]$
(e) We have,
$(-380)+(-270) = -(380+270) = -650$
(f) We have,
$(-217)+(-100) = -(217+100) = -317$

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4. **Find the sum of**
   (a) 137 and − 354　　　**(b)−52 and 52**　　　　**(c) −312, 39 and 192**　　　**(d) −50, −200 and 300**

Sol. (a) We have,
$137+(-354) = 137+(-137)+(-217)$
$[\because 354 = 137+217 \Rightarrow -354 = -137+-217]$
$= 0+(-217) = -217 [\because 137+(-137) = 0]$
(b) We have, $-52+(+52) = 0$
(c) We have,
$-312+39+192 = -312+231 = (-231)+(-81)+231 [\because 312 = 231+81 \Rightarrow -312 = -231+(-81)]$
$= (-231)+231+(-81)$

$= 0 + (-81) = -81 [\because (-231) + 231 = 0]$

(d) We have,

$(-50) + (-200) + (300) = -(50 + 200) + 300$

$= (-250) + (300) \ [\because 300 + 250 + 50]$

$= (-250) + (250) + (50)$

$= 0 + 50 = 50$

$[\because (-250) + (250) = 0]$

5. **Find the sum:**

(a) (–7) + (–9) +4+16

(b) (37) + (–2) + (–65) + (–8)

Sol. (a) We have,

$(-7) + (-9) + 4 + 16 = -(7 + 9) + 4 + 16$

$[\because 20 = 16 + 4]$

$= -16 + 20 = -16 + 16 + 4$

$= 0 + 4 = 4 \qquad [\because -16 + 16 = 0]$

(b) We have,

$(37) + (-2) + (-65) + (-8) = 37 - (2 + 65 + 8)$

$= 37 - 75 = 37 - 37 - 38$

$[\because 75 = 37 + 38 \Rightarrow -75 - 37 - 38]$

$= 0 - 38 = -38 \qquad [\because -37 + 37 = 0]$

Exercise 6.3

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1. **Find**

(a) $35 - (20)$ **(b)** $72 - (90)$ **(c)** $(-15) - (-18)$ **(d)** $(-20) - (13)$

(e) $23 - (-12)$ **(j)** $(-32) - (-40)$

Sol. (a) We have, $35 - (20) = 35 + (\text{Additive inverse of } 20) = 35 + (-20)$

$= 15 + 20 + (-20) \qquad [\because 35 = 20 + 15]$

$= 15 + 0 = 15 \qquad [\because 20 + (-20) = 0]$

(b) We have,

$72 - 90 = 72 + (\text{Additive inverse of } 90)$

$= 72 + (-90) = 72 + (-72) + (-18)$

$[\because 90 = 72 + 18 \Rightarrow -90 = -72 + (-18)]$

$= 0 + (-18) = -18$ $\qquad [\because 72 + (-72) = 0]$

(c) We have,

$(-15) - (-18) = -15 + (\text{Additive inverse of } -18)$

$= -15 + 18$

$= (-15) + (15) + (3)$ $\qquad [\because 18 = 15 + 3]$

$= 0 + 3 = 3$ $\qquad [\because (-15) + (15) = 0]$

(d) We have,

$(-20) - (13) = (-20) + (\text{Additive inverse of } 13)$

$= (-20) + (-13) = -(20 + 13) = -33$

(e) We have,

$23 - (-13) = 23 + (\text{Additive inverse of } -12)$

$= 23 + 12 = 35$

(f) We have,

$(-32) - (-40) = (-32) + (\text{Additive inverse of } -40)$

$= (-32) + 40 = (-32) + (32) + (8)[\because 40 = 32 + 8]$

$= 0 + 8 = 8$ $\qquad [\because (-32) + (32) = 0]$

2. **Fill in the blanks with >, < or = sign.**

(a) $(-3) + (-6) \_\_\_(-3) - (-6)$ **(b)** $(-21) - (-10) \_\_\_(-31) + (-11)$

(c) $45 - (-11) \_\_\_57 + (-4)$ **(d)** $(-25) - (-42) \_\_(-42) - (-25)$

> **TIPS**
> Firstly, find the value of LHS (left hand side) and RHS (right hand side).
> Then, put the sign > (greater than), < (less than) or = (equal to) byusing these rules
> (i) Every positive integer > 0 then negative integer.
> (ii) Every negative integer < 0 then positive integer.
> (iii) If LHS and RHS give same value, then use equal to (=)

Sol. (a) We have, $(-3) + (-6) \_\_(-3) - (-6)$

LHS $= (-3) + (-6) = -9$

RHS $= (-3) - (-6) = (-3) + (\text{Additive inverse of } -6)$

$= -3 + 6 = 3$

Since, −9 is a negative integer and 3 is a positive integer.

$\therefore \qquad -9 \boxed{<} 3$

(b) We have, $(-21) - (-10) \_\_(-31) + (-11)$

LHS $= (-21) - (-10) = -21 + (\text{Additive inverse of} -10) = -21 + 10 = -11$

RHS $= (-31) + (-11) = -42$

Here, both are negative integers but −42 is to the left of −11.

$\therefore \qquad -11 \boxed{>} -42$

(c) We have, $45 - (-11) \_\_57 + (-4)$

LHS $= 45 - (-11) = 45 + 11$ $[\because \text{Additive inverse of } -11 \text{ is } 11]$

$= 56$

RHS $= 57 + (-4) = 53 + 4 + (-4) = 53 + 0 = 53$

Here, both are positive integers but 56 is to the right of 53.

$\therefore \qquad 56 \boxed{>} 53$

(d) We have, $(-25)-(-42)\underline{\quad}-42-<-25)$

$LHS=(-25)-(-42)=-25+$ (Additive inverse of –42)

$=-25+42=17$

$RHS=-42-(-25)=-42+$ (Additive inverse of –25)

$=-42+25=-17$

Here, 17 is a positive integer and – 7 is a negative integer.

$\therefore \qquad 17\boxed{>}-17$

3. **Fill in the blanks.**

(a) $(-8)+\underline{\quad}=0$ **(b)** $13+\underline{\quad}=0$ **(c)** $12+(-12)=\underline{\quad}$ **(d)** $(-4)+\underline{\quad}=-12$

(e) $\underline{\quad}-15=-10$

> **TIPS**
> We know that, if sum of two integers is zero, then these number arecalled additive inverse of each other. So, to find the additive inverse ofa number reverse its sign i.e. if number is positive, then its additiveinverse is negative and vice-versa.

Sol. (a) We have, $\quad(-8)+\underline{\quad}=0$

$(-8)+8=0 \quad$ [$\because$ Additive inverse of –8 is 8]

(b) We have, $\quad 13+\underline{\quad}=0$

$13+(-13)=0$ [$\because$ Additive inverse of –13 is 13]

(c) We have, $12+(-12)=\underline{\quad}12+(-12)=0$

[$\because$ 12 and –12 are additive inverse of each other]

(d) We have, $\quad(-4)+\underline{\quad}=-12$

Here, sum of two integers is not zero, so here we cannot writeadditive inverse of –4.

$\qquad -4+\underline{\quad}=-12 \Rightarrow -4+\underline{\quad}=-(4+8) \Rightarrow \qquad -4+\underline{\quad}=(-4)+(-8)$

So, on comparing both sides, we get –8 to fill the blank space.

Thus, $\quad(-4)+(-8)=-12$

(e) We have,

$\underline{\quad}15=-10 \Rightarrow \underline{\quad}-(10+5)=-10$

$\Rightarrow \qquad \underline{\quad}-10-5=-10$

To get RHS = –10, we need to add additive inverse of –5, i.e. 5in RHS.

So, $\qquad +5-10-5=-10$

Hence, $\;+5-15=-10$

4. **Find**

(a) $(-7)-8-(-25)$ **(b)** $(-13)+32-8-1$ **(c)** $(-7)+(-8)+(-90)$ **(d)** $50-(-40)-(-2)$

Sol. (a) $(-7)-8-(-25)=(-7)+(-8)+25$

[$\because$ Additive inverse of –25 is 25]

$=-15+25=-15+15+10$ [$\because 25=15+10$]

$=0+10=10 \qquad$ [$\because -15+15=0$]

(b) $(-13)+32-8-1=(-13)+32-9$

$=-13+32+$ (Additive inverse of 9)

$=(-13)+32+(-9)$

$=-13-9+32=-22+32 \; [\because 32=22+10]$

$=-22+22+10$

$=0+10=10 \qquad\qquad$ [$\because -22+22=0$]

(c) $(-7)+(-8)+(-90)=-15+(-90)=-105$

(d) $50-(-40)-(-2)=50+$ (Additive inverse of – 40)+ (Additive inverse of –2)

$=50+40+2=92$

Directions In Questions 1 to 8, only one of the four options is correct. Write the correct one.

1. **The predecessor of the integer –15 is**
    (a) 1   (b) 2
    (c) –2   (d) 1
Sol. We know that, one less than a given integer, gives a predecessor.
    ∴ The predecessor of the integer
    $-1 = -1 - 1 = -2$
    Hence, the option (c) is correct.

2. **The least integer lying between –10 and –15 is**
    (a) –10   (b) – 11
    (c) –15   (d) –14
Sol. ∵ The integers between –10 and –15 are –11, –12, –13 and –14.
    ∴ The integer –11 is the largest and –14 is the smallest.
    Hence, the option (d) is correct.

3. **The integer with negative sign (–) is always less than**
    (a) 0   (b) – 3
    (c) –1   (d) –2
Sol. We know that, negative integer is always less than zero.
    Hence, the option (a) is correct.

4. **The successor of the predecessor of –50 is**
    (a) –48   (b) –49
    (c) –50   (d) –51
Sol. We know that, one less than given number gives a predecessor and one more than given number gives a successor.
    ∴ The predecessor of $-50 = -50 - 1 = -51$
    and the successor of $-51 = -51 + 1 = -50$
    Hence, the option (c) is correct.

5. **The additive inverse of a negative integer**
    (a) is always negative   (b) is always positive
    (c) is the same integer   (d) zero
Sol. We know that, additive inverse of an integer is obtained by changing the sign of the integer.
    ∴ The additive inverse of a negative integer is always positive.
    e.g. Let a negative integer be –5.
    ∴ The additive inverse of –3 = –(–3) = 3
    Hence, the option (b) is correct.

6. Amulya and Amar visited two places A and B, in Kashmir and recorded the minimum temperatures on a particular day as -4^oC at A and -1^oC at B. Which of the following statement is true?
(a) A is cooler than B
(b) −B is cooler than A
(c) There is a difference of 2^oC in the temperature
(d) The temperature at A is 4^oC higher than that at B

Sol. We know that, as the temperature decrease the cooling increases.
For place A, minimum temperature on a particular day is -4^oC and for place B, it is -1^oC
Here, $-4°C < -1°C$
∴ A is cooler than B. Hence, the option (a) is correct.

7. When a negative integer is subtracted from another negative integer, the sign of the result
(a) is always negative
(b) is always positive
(c) is never negative
(d) depends on the numerical value of the integers

Sol. Let two negative integers be −7 and −11.
We subtract (−7) from −11 and give a minus sign to the result.
i.e. $-11-(-7) = -11+7 = -4$
Again, we subtract −11 from −7 and give a plus sign to the result.
i.e. $-7-(-11) = -7+11 = 4$
Hence, a negative integer is subtracted from another negative integer, the sign of the result depends on the numerical value of the integers.
Hence, the option (d) is correct.

8. Which of the following shows the maximum rise in temperature?
(a) 0^oC to 10^oC (b) -4^oC to 8^oC
(c) -15^oC to -8^oC (d) -7^oC to 0^oC

Sol. We know that, the maximum rise in the temperature is equal to the maximum value of difference of two temperatures.
(a) Difference of 0^oC
and $10^oC = (10^oC - 0^oC) = (10-0)^oC = 9^oC$
(b) Difference of -4^oC
and $8^oC = 8^oC - (-4^oC) = (8+4)^oC = 12^oC$
(c) Difference of -15^oC
and $-8^oC = -8^oC - (-15^oC) = -8^oC + 15^oC$
$= 15^oC - 8^oC = (15-8)^oC = 7^oC$
(d) Difference of -7^oC and
$0^oC = 0^oC - (-7^oC) = 0^oC + 7^oC$
$= (0+7)^oC = 7^oC$
Hence, the option (b) is correct.

Directions In Questions 9 to 12, state whether the given statements are true (T) or false (F).

9. The sum of all the integers between −5 and −1is −6.

Sol. False, the integers between –5 and –1 are –4, –3, –2, –1.

∴ Sum of integers –4, –3, –2 and –1

$$= -4 + (-3) + (-2) + (-1) = -4 - 3 - 2 - 1 = -10$$

10. **The sum of any two negative integers is always greater than both the integers.**

Sol. False, let two negative integers be –3 and –5.

Now, sum of –3

and $-5 = -3 + (-5) = -3 - 5 = -8$

Here, –8 < –3 and –8 < –5.

11. **The difference between an integer and its additive inverse is always even.**

Sol. True, let a integer be –3 and additive inverse of –3 is 3.

Now, the difference between 3

and –3=3– (–3) =3+3=6

Hence, the difference between an integer and its additive inverse is always even.

12. **The sum of three different integers can never be zero.**

Sol. False, let the three integers be 2, 3, and –5.

Sum of 2, 3 and

$$-5 = 2 + 3 + (-5) = 2 + 3 - 5 = 5 - 5 = 0$$

Directions In questions 13 and 14, fill in the blanks using <, = or>

13. $-11 + (-15) \_ 11 + 15$

Sol. $\text{LHS} = -11 + (-15) = -11 - 15 = -26;$

$\text{RHS} = 11 + 15 = 26$

Here, **–26 < 26** [∵ –26 is to the left of 26]

$-11 + (-15) < 11 + 15$

14. $(-2) + -5 + (-6) \_ (-3) + (-4) + (-6)$

Sol. $\text{LHS} = (-2) + (-5) + (-6) = -2 - 5 - 6 = -13$

$\text{RHS} = (-3) + (-4) + (-6) = -3 - 4 - 6 = -13$

Here, $-13 = -13$

∴ $(-2) + (-5) + (-6) = (-3) + (-4) + (-6)$

15. **Match the items of Column I with that of Column II.**

Column I	Column II
(i) The additive inverse of +2	(a) 0
(ii) The greatest negative integer	(b) -2
(iii) The greatest negative even integer	(c) 2
(iv) The smallest integer than every negative integer	(d) 1
(v) Sum of predecessor and successor of -1	(e) -1

Sol. (i) The additive inverse of $+2 = -2$
(ii) The greatest negative integer $= -1$
(iii) The greatest negative even integer $= -2$
(iv) The smallest integer greater than every negative integer $= 0$
(v) The predecessor of $-1 = -1 - 1 = -2$ and the successor of $-1 = -1 + 1 = 0$
∴ Sum of predecessor and successor of $-1 = -2 + 0 = -2$
(i) $\rightarrow b$ (ii) $\rightarrow e$
(iii) $\rightarrow b$ (iv) $\rightarrow a$
(v) $\rightarrow b$

16. **If we denote the height of a place above sea level by a positive integer and depth below the sea level by a negative integer, write the following using integers with the appropriate signs**
(a) 200 m above sea level
(b) 100 m below sea level
(c) 10 m above sea level
(d) sea level

Sol. Given, the height of a place above sea level is denoted by (+) sign and depth below the sea level by is denoted by (–) sign.
(a) We can write 200 m above sea level as +200m because above sea level represent +sign.
(b) We can write 100 m below sea level as –100 m because below sea level represent – sign.
(c) We can write 10 m above sea level as +100 m because above sea level represent + sign.
(d) We can write sea level as 0 m because sea level is neither above nor below.

17. **Write two integers, whose sum is 6 and difference is also 6.**

Sol. We know that, 0 is an integer such that if we add any integer to itthen we get same integer and if we subtract it from any integer, then also we get same integer. So, possible two integers are 6 and 0.
i.e. 6 + 0 = 6 and 6 – 0 = 6

18. **Observe the following :**
$1 + 2 - 3 + 4 + 5 - 6 - 7 + 8 - 9 = -5$
Change one '−' sign as '+' sign to get the sum 9.

Sol. Given, $1 + 2 - 3 + 4 + 5 - 6 - 7 + 8 - 9 = -5$
Now, add 14 both sides, because we have to get the sum of 9.
$1 + 2 - 3 + 4 + 5 - 6 - 7 + 8 - 9 + 14 = -5 + 14$
Now, we can arrange the integer so that the positive integers and negative integers are grouped together.
∴ $1 + 2 + 4 + 5 + 8 + 14 + (-3) + (-6) + (-7) + (-9)$
$= 1 + 2 + 4 + 5 + 8 + 14 - 3 - 6 - 7 - 9 = 34 - 25 = 9$ As we add 14 on left hand side, we see that $(-7 + 14) = +7$, it means that we have to change the sign of 7.

19. **The sum of two integers is 30. If one of the integers is then find the other.**

Sol. Given, the sum of two integers = 30 and one of the integer = –42
Now, the other integer is obtained by subtracting –42 from 30.
∴   The required integer
$= 30 - (-42) = 30 + 42 = 72$
Hence, the second integer is 72.

20. **Arrange the following integers in the ascending order.** $-2, 1, 0, -3, +4, -5$

Sol. Integers –2, 1, 0, –3, +4, and –5 are on number line are shown as below

Now, increasing (ascending) order of these integers is $-5 < -3 < -2 < 0 < 1 < 4$

21. **Write six distinct integers whose sum is 7.**

Sol. Let the six integers be 1, 2, −2, 3, −3 and 6.

Now, sum of above integers = 1 + 2 + (−2) + 3 + (−3) + 6We can arrange the numbers so that the positive integers and the negative integers are grouped together.
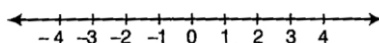
We have, i.e.

$=1+2+3+6+(-2)+(-3)=12-2-3=12-5=7$ Hence, required integers are 1, 2, −2, 3, -3 and 6.

Note There are infinite combination exist.

22. **Write the integer, which is 4 more than its additive inverse.**

Sol. Firstly, draw a number line.

Let +1 be an integer and its additive inverse is −1. From the number line, we see that 2 more than its additive inverse. So, we reject this integer.

Again, let +2 be an integer and its additive inverse is −2. From the number line, we see that 4 more than its additive inverse.

Hence, the required integer is 2.

23. **Temperature of a place at 12:00 noon was $+5^o C$.**

Temperature increased by $3^o C$ in first hour and decreased by $1^o C$ in the second hour. What was the temperature at 2:00 pm?

Sol. Given, initial temperature at 12:00 noon was $+5^o C$. Since, the temperature increased by $3^o C$ in first hour.

∴ Temperature at 1: 00 pm $=5^o C+3^o C=8^o C$

Also, the temperature decreased by $1^o C$ in the second hour.

∴ Temperature at 2:00 pm $=8^o C-1^o C=7^o C$

Hence, the temperature at 2:00 pm is $7^o C$.

24. **Write the digits 0, 1, 2, 3, ..., 9 in this order and insert'+' or '−'between them to get the result 3.**

Sol. Arrange the given digit in given order, we have

$0-1-2-3-4-5-6+7+8+9=-21+24=3$

25. **Subtract −5308 from the sum** $[(-2100)+(-2001)]$.

Sol. Firstly, we find the sum $[(-2100)+(-2001)]$

Sum of -2100 and $-2001 = -2100+(-2001)$

$=-2100-2001=-4101$

Now, subtract -5308 from −4101.

$-4101-(-5308)=-4101+5308=+1207$

26. **Compute each of the following :**

(a) $30+(-25)+(-10)$ **(b)** $(-20)+(-5)$

(c) $70+(-20)+(-30)$ **(d)** $-50+(-60)+50$

(e) $1+(-2)+(-3)+(-4)$ **(f)** $0+(-5)+(-2)$

(g) $0-(-6)-(+6)$ **(h)** $0-2-(-2)$

Sol. (a) $30+(-25)+(-10)=30-(25+10)=$

$30 - 35 = 30 + (-30) + (-5)$

$= 0 + (-5) = -5 \ [\because +30 - 30 = 0]$

(b) $(-20) + (-5) = -(20 + 5) = -25$

(c) $70 + (-20) + (-30) = 70 - (20 + 30) = 70 - 50$

$= (+20) + (+50) + (-50) \ [\because 70 = 20 + 50]$

$= +20 + 0 = 20$

(d) $-50 + (-60) + 50$

$= -50 + (-10) + (-50) + 50 \ [\because 60 = 10 + 50]$

$= -50 + (-10) + 0 = -(50 + 10) = -60$

(e) $1 + (-2) + (-3) + (-4) = 1 - (2 + 3 + 4) = 1 - (9) = -8$

(f) $0 + (-5) + (-2) = (-5) + (-2) = -(5 + 2) = -7$

(g) $0 - (-6) - (+6) = 0 - (-6 + 6) = -(0) = 0$

(h) $0 - 2 - (-2) = -2 - (-2) = -(2 - 2) = -(0) = 0$

27. **Using number line, how do you compare**
**(a) two negative integers?**
(b) two positive integers?
(c) one positive and one negative integer?

Sol. We know that on the number line points to the right of zero are positive integers and points to the left of zero are negative integers.

Also if move from left to the right on the number line, then number increases and if we move from right to the left on the number line, the number decreases.
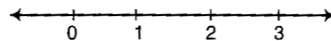
If we compare two negative integers on the number line, then the number which is on right of the other number will be greater if e.g.
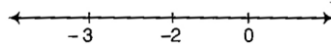
Here, we see that - 2 is on the right of –3, so–2 is greater and3 is smaller.

(b) If we compare two positive integers on the number line, then the number which is on right of the other number will be greater
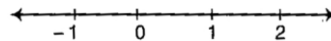
e.g.

Here, we see that 3 is on right of the 1, so 3 is greater and 1 is smaller.

(c) If we compare one positive and one negative integers on the number line, then the number which is on right of the other number will be greater.

e.g.

Here, we see that 2 is on right of the –1, so 2 is greater and –1 is smaller.