CHAPTER 6

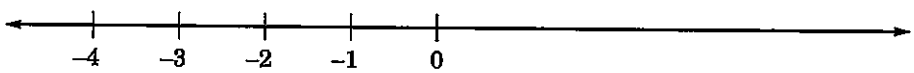
Integers

Understanding the Lesson

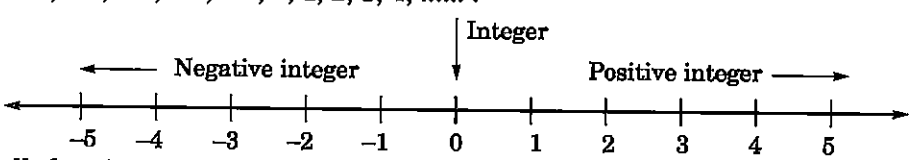
- Integers and their representation on number line.
- Successor and predecessor of integers.
- Ordering of integers.
- Addition and subtraction of integers with the help of number line.
- Algebra of integers.

Conceptual Facts

- On a number line, the numbers left to 0 are called negative numbers.



- Natural numbers are 1, 2, 3, 4, ...
- Whole numbers are 0, 1, 2, 3, 4, ...
- Negative numbers are ....., – 4, – 3, – 2, – 1.
- Integers are ....., – 4, – 3, – 2, – 1, 0, 1, 2, 3, 4, ...



- 0 is simply called an integer. It has no sign.
- Positive and negative integers are used in daily life for profit and loss, rise and fall, above and below, etc.
- Negative of a negative integer = positive integer. *i.e.*, $-(-x) = x$
- Every positive number is larger than every negative number.
- Farther a number from zero on the right, larger is its value.
- Farther a number from zero on the left, smaller is its value.
- Absolute value is a numerical value of a number which is represented by ||.
- The absolute value of + 5 = | + 5 | = 5
  Absolute value of – 5 = | – 5 | = 5
  Absolute value of 0 is 0 *i.e.*, | 0 | = 0

TRY THESE (*PAGE 116*)

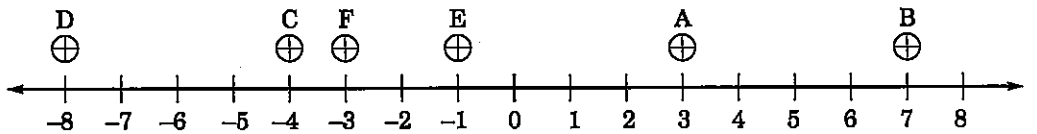
Q1. Write the following numbers with appropriate signs:
(*a*) 100 m below sea level.
(*b*) 25°C above 0°C temperature.
(*c*) 15°C below 0°C temperature.
(*d*) any five numbers less than 0.

Sol. (*a*) 100 m below sea level = – 100 m
(*b*) 25°C above 0°C temperature = + 25°C
(*c*) 15°C below 0°C temperature = – 15°C
(*d*) Five numbers less than 0 = –1, – 2, – 3, – 4, – 5

TRY THESE (*PAGE 118*)

Q1. Mark: 3, 7, – 4, – 8, – 1 and – 3 on the number line.

Sol. Required number line showing the given numbers is



We have 3 is at A; 7 is at B; – 4 is at C; – 8 is at D; – 1 is at E; – 3 is at F

TRY THESE (*PAGE 119*)

Q. Compare the following pairs of numbers using > or <.

0 ☐ – 8; – 1 ☐ – 15; 5 ☐ – 5;

11 ☐ 15; 0 ☐ 6; – 20 ☐ 2

From the above exercise, Rohini arrived at the following conclusions:

(*a*) Every positive integer is larger than every negative integer.

(*b*) Zero is less than every positive integer.

(*c*) Zero is larger than every negative integer.

(*d*) Zero is neither negative integer nor a positive integer.

(*e*) Farther a number from zero on the right, larger is its value.

(*f*) Farther a number from zero on the left, smaller is its value.

Do you agree with her? Give examples.

Sol. 0 [>] – 8; – 1 [>] – 15; 5 [>] – 5

11 [<] 15; 0 [<] 6; – 20 [<] 2

(*a*) Yes, 5 is larger than – 5

(*b*) Yes, 0 is less than 2

(*c*) Yes, 0 is larger than – 3

(*d*) Yes

(*e*) 0, 6, 7, 8 .....

(*f*) – 4, – 3, – 2, – 1, 0

EXERCISE 6.1

Q1. Write opposites of the following:

(*a*) Increase in weight (*b*) 30 km North

(*c*) 326 BC (*d*) Loss of ₹ 700

(*e*) 100 m above sea level.

Sol. (*a*) Decrease in weight (*b*) 30 km South

(*c*) 326 AD (*d*) Profit of ₹ 700

(*e*)100 m below sea level.

Q2. Represent the following numbers as integers with appropriate signs.

(*a*) An aeroplane is flying at a height 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*) + 2000 m (*b*) – 800 m

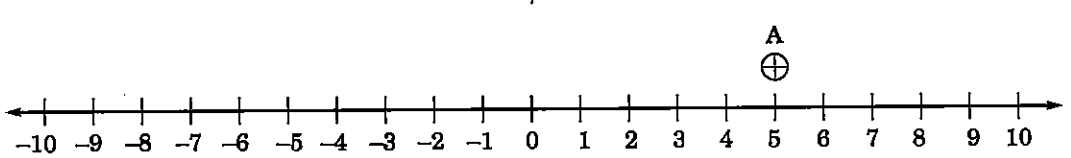
(*c*) + ₹ 200 (*d*) – ₹ 700

Q3. Represent the following numbers on a number line:

(*a*) + 5 (*b*) – 10 (*c*) ± 8

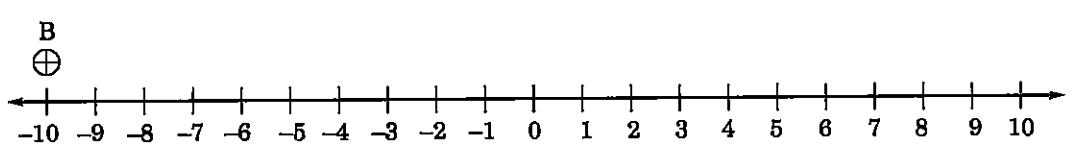
(*d*) – 1 (*e*) – 6

Sol. (*a*)



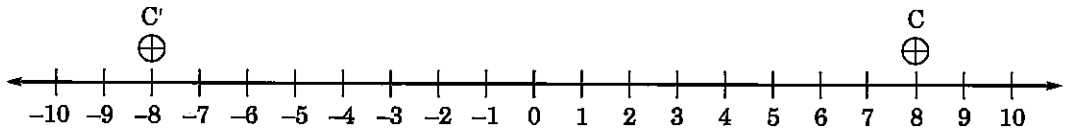
Here A represents + 5.

(*b*)



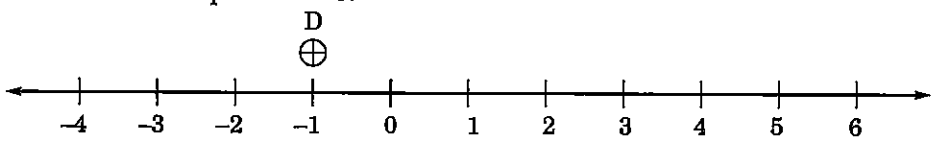
Here B represents – 10.

(c)



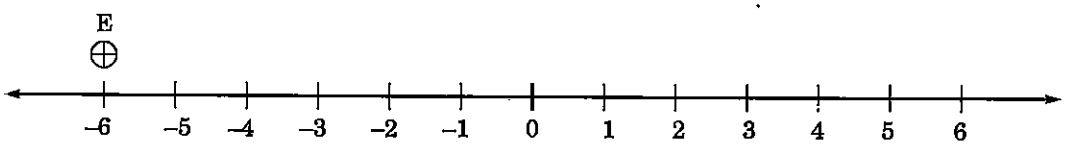
Here C and C' represent ± 8.

(d)



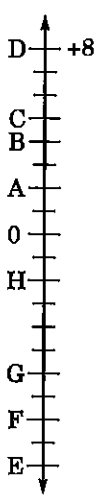
Here, D represents – 1.

(e)



Here, E represents – 6.

Q4. Adjacent figure is a vertical number line, representing integers. Observe it and locate the following points:



(a) If point D is + 8, then which point is – 8?

(b) Is point G a negative integer or a positive integer?

(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.

Sol. (a) F represents – 8

(b) G is a negative integer.

(c) B represents + 4 and E represents – 10

(d) E has the least value of – 10.

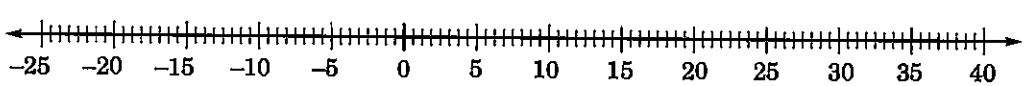
(e) Decreasing order of all the points are: D, C, B, A, 0, H, G, F and E.

Q5. Following is the list of temperatures of five places in India on a particular day of the year.

Place	Temperature	
Siachin	10°C below 0°C	.....
Shimla	2°C below 0°C	.....
Ahmedabad	30°C above 0°C	.....
Delhi	20°C above 0°C	.....
Srinagar	5°C below 0°C	.....

(a) Write the temperatures of these places in the form of integers in the blank column.

(b) Following is the number line representing the temperature in degree Celsius.



Plot the name of the city against its temperature.

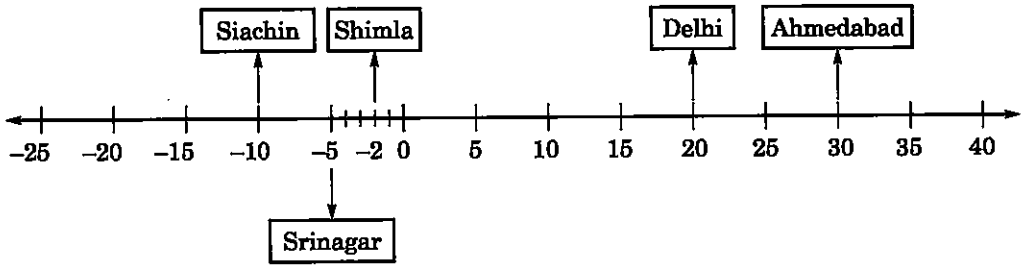
(c) Which is the coolest place?

(d) Write the names of the places where temperatures are above 10°C.

Sol. (a)

Place	Temperature	In the form of integers
Siachin	10°C below 0°C	– 10°
Shimla	2°C below 0°C	– 2°C
Ahmedabad	30°C above 0°C	+ 30°C
Delhi	20°C above 0°C	+ 20°C
Srinagar	5°C below 0°C	– 5°C

(b)



(c) Siachin is the coolest place with – 10°C temperature.

(d) (i) Delhi → 20°C (ii) Ahemedabad → 30°C

Q6. 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) 9 is to the right of 2

(b) – 3 is to the right of – 8

(c) 0 is to the right of – 1

(d) 10 is to the right of – 11

(e) 6 is to the right of – 6

(f) 1 is to the right of – 100.

Q7. Write all the integers between the given pairs (write them in the increasing order):

(a) 0 and – 7 (b) – 4 and 4

(c) – 8 and – 15 (d) – 30 and – 23

Sol. (a) Integers between 0 and – 7 are: – 6, – 5, – 4, – 3, – 2, – 1.

(b) Integers between – 4 and 4 are: – 3, – 2, – 1, 0, 1, 2, 3.

(c) Integers between – 8 and – 15 are: – 14, – 13, – 12, – 11, – 10, – 9.

(d) Integers between – 30 and – 23 are: – 29, – 28, – 27, – 26, – 25, – 24.

Q8. (a) Write four negative integers greater than – 20.

(b) Write four negative integers less than – 10.

Sol. (a) Four negative integers greater than – 20 are: – 19, – 18, – 17, – 16.

(b) Four negative integers less than – 10 are: – 11, – 12, – 13, – 14.

Q9. 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 (T)

(b) False (F); Correction: – 100 is to the left of – 50 on a number line.

(c) False (F); Correction: There is no smallest negative integer.

(d) False (F); Correction: – 26 is smaller than – 25.

Q10. Draw a number line and answer the following:

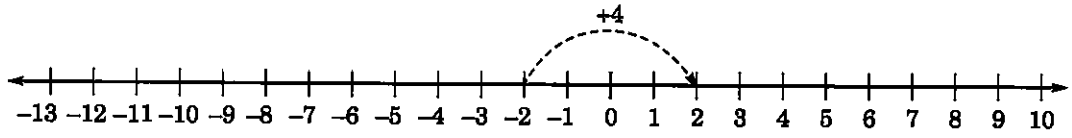
(a) Which number will we reach if we move 4 numbers to the right of – 2.

(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?

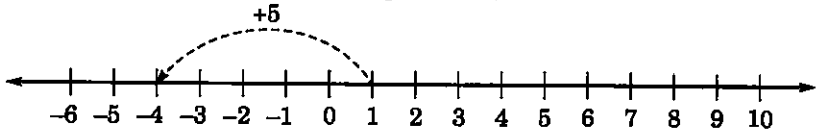
(d) If we are at – 6 on the number line, in which direction should we move to reach – 1?

Sol. (*a*)



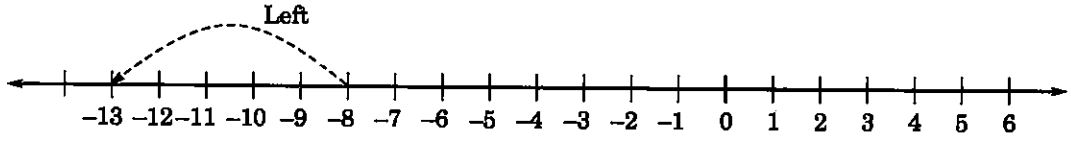
If we move 4 numbers to the right of –2, we will reach 2.

(*b*)



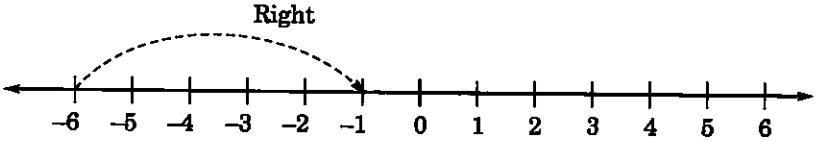
If we move 5 numbers to the left of 1, we will reach – 4.

(*c*)



We will move to the left of –8 to reach –13.

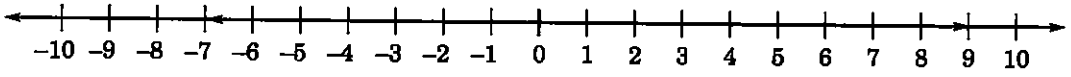
(*d*)



We should move right to –6 to reach –1.

TRY THESE (*PAGE 123*)

Q1. Draw a figure on the ground in the form of a horizontal number line as shown below. Frame questions as given in the said example and ask your friends.



Sol. Try yourself.

TRY THESE (*PAGE 125*)

Q1. Find the answers of the following additions:

(*a*) (– 11) + (– 12) (*b*) (+ 10) + (+ 4)

(*c*) (– 32) + (– 25) (*d*) (+ 23) + (+ 40)

Sol. (*a*) (– 11) + (– 12) = – [11 + 12] = – 23

(*b*) (+ 10) + (+ 4) = + [10 + 4] = + 14

(*c*) (– 32) + (– 25) = – [32 + 25] = – 57

(*d*) (+ 23) + (+ 40) = + [23 + 40] = + 63 = 63.

TRY THESE (*PAGE 125*)

Q1. Find the solution of the following:

(*a*) (– 7) + (+ 8) (*b*) (– 9) + (+ 13)

(*c*) (+ 7) + (– 10) (*d*) (+ 12) + (– 7)

Sol. (*a*) (– 7) + (+ 8) = (– 7) + (+ 7) + (+ 1) = 0 + (+ 1) = (+ 1) = 1

(*b*) (– 9) + (+ 13) = (– 9) + (+ 9) + (+ 4) = 0 + (+ 4) = (+ 4) = 4

(*c*) (+ 7) + (– 10) = (+ 7) + (– 7) + (– 3) = 0 + (– 3) = (– 3) = – 3

(*d*) (+ 12) + (– 7) = (+ 5) + (+ 7) + (– 7) = (+ 5) + 0 = (+ 5) = 5.

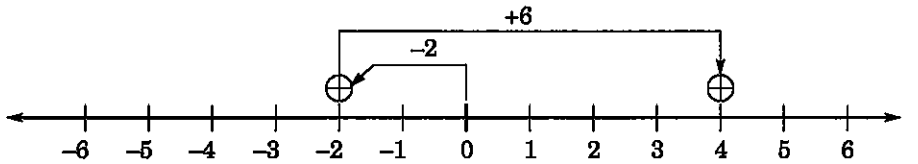
TRY THESE (*PAGE 127*)

Q1. Find the solution of the following additions using a number line:

(*a*) (– 2) + 6 (*b*) (– 6) + 2

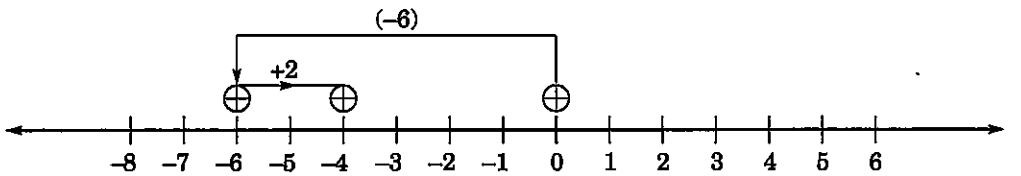
Make two such questions and solve them using the number line.

Sol. (*a*) (– 2) + 6



First, we move 2 steps from 0 to the left to reach –2 and then 6 steps to right of it to reach 4.
Hence, (–2) + 6 = 4.

(*b*) (– 6) + 2

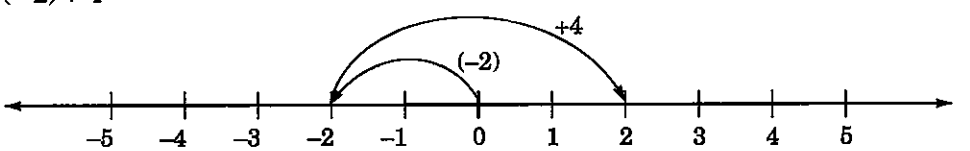


We first move from 0 to the left to reach – 6 and then move 2 steps to right to reach – 4.
Hence, (– 6) + 2 = – 4.

SIMILAR QUESTIONS:

1. (– 2) + 4

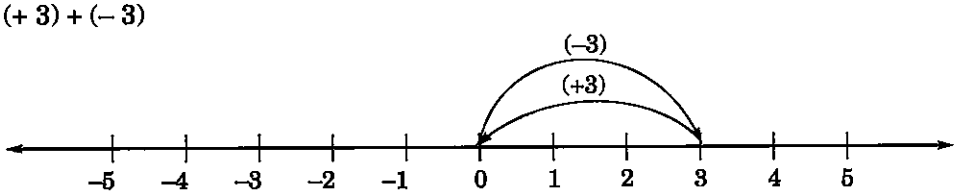
Sol.



First, we move two steps left to 0 to reach – 2 and them move 4 steps right to it to reach 2.
Hence, (– 2) + 4 = 2.

2. (+ 3) + (– 3)

Sol.



We first move 3 steps right to 0 to reach 3 and then move 3 steps left to it to reach 0.
Hence, (+ 3) + (– 3) = 0.

3. Find the solution of the following without using number line:

(*a*) (+ 7) + (– 11) (*b*) (– 13) + (+ 10)

(*c*) (– 7) + (+ 9) (*d*) (+ 10) + (– 5)

Make five such questions and solve them.

Sol. (*a*) (+ 7) + (– 11) = (+ 7) + (– 7) + (– 4) = 0 + (– 4) = (– 4) = – 4

(*b*) (– 13) + (+ 10) = (– 3) + (– 10) + (+ 10) = (– 3) + 0 = (– 3) = – 3

(*c*) (– 7) + (+ 9) = (– 7) + (+ 7) + (+ 2) = 0 + (+ 2) = (+ 2) = 2

(*b*) (+ 10) + (– 5) = (+ 5) + (+ 5) + (– 5) = (+ 5) + 0 = (+ 5) = 5.

SIMILAR QUESTIONS:

1. Find the solution of the following without using number line:

(*a*) (– 6) + (+ 10) (*b*) (– 3) + (8)

(*c*) (+ 6) + (– 9) (*d*) (+ 1) + (– 6)

(*e*) (+ 10) + (– 12)

Sol. (*a*) (– 6) + (+ 10) = (– 6) + (+ 6) + (+ 4) = 0 + (+ 4) = (+ 4) = 4

(*b*) (– 3) + (8) = (– 3) + (+ 3) + (+ 5) = 0 + (+ 5) = (+ 5) = 5

(*c*) (+ 6) + (– 9) = (+ 6) + (– 6) + (– 3) = 0 + (– 3) = (– 3) = – 3

(*d*) (+ 1) + (– 6) = (+ 1) + (– 1) + (– 5) = 0 + (– 5) = (– 5) = – 5

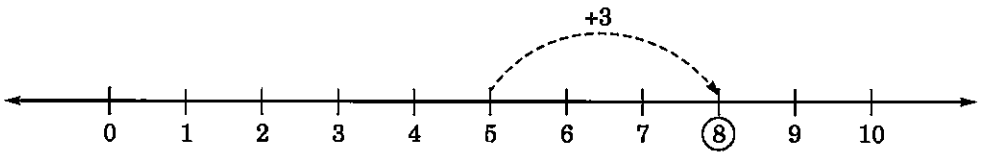
(*e*) (+ 10) + (– 12) = (+ 10) + (– 10) + (– 2) = 0 + (– 2) = (– 2) = – 2.

EXERCISE 6.2

1. Using the number line write the integer which is:

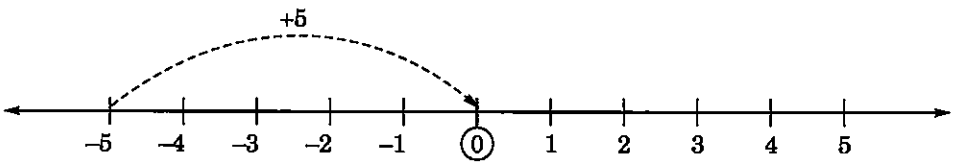
(*a*) 3 more than 5 (*b*) 5 more than – 5 (*c*) 6 less than 2 (*d*) 3 less than – 2.

Sol. (*a*) 3 more than 5



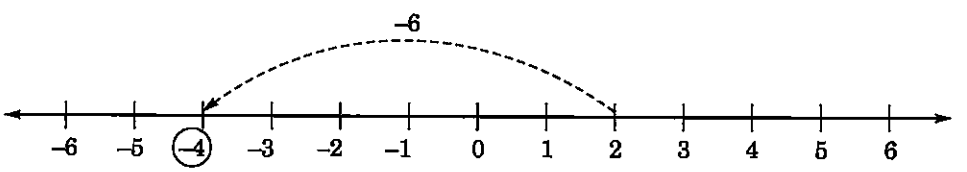
Moving right 3 steps from 5, we reach at 8. Hence, 3 more than 5 = 8.

(*b*) 5 more than – 5



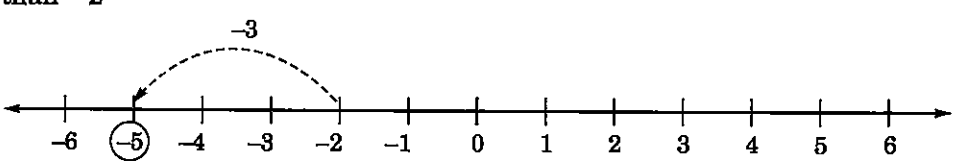
Moving right 5 steps from – 5 we reach at 0. Hence, 5 more than –5 = 0

(*c*) 6 less than 2



Moving left 6 steps from 2, we reach at – 4. Hence, 6 less than 2 = – 4

(*d*) 3 less than – 2



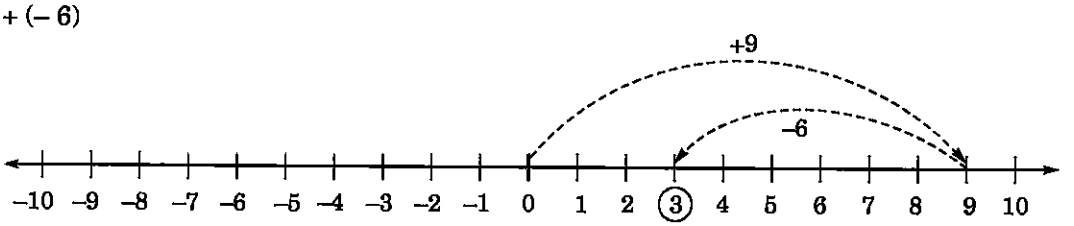
Moving left 3 steps from – 2, we reach at – 5.

Q2. Use number line and add the following integers:

(*a*) 9 + (– 6) (*b*) 5 + (– 11) (*c*) (– 1) + (– 7)

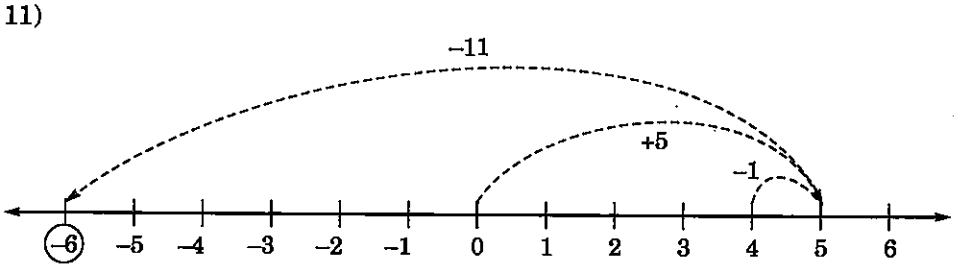
(*d*) (– 5) + 10 (*e*) (– 1) + (– 2) + (– 3) (*f*) (– 2) + 8 + (– 4).

Sol. (*a*) 9 + (– 6)



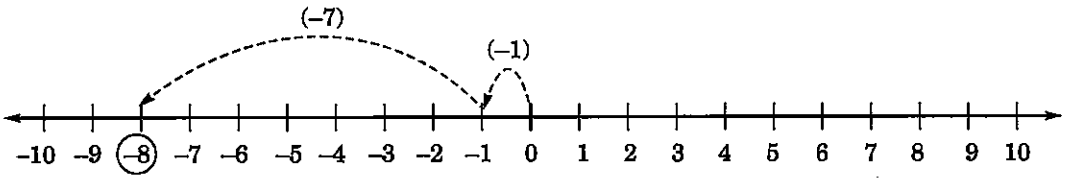
Hence, 9 + (– 6) = 3.

(*b*) 5 + (– 11)



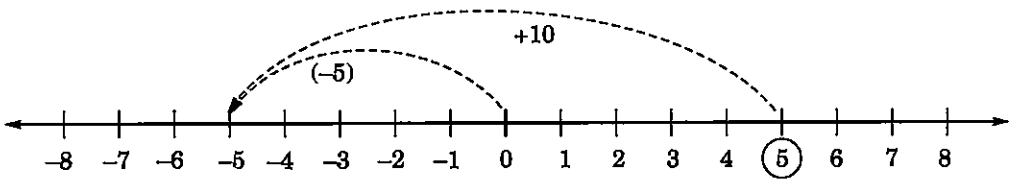
Hence, 5 + (– 11) = –6.

(c) (– 1) + (– 7)



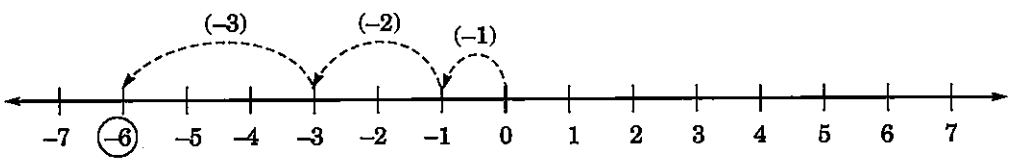
Hence, (– 1) + (– 7) = (– 8).

(d) (– 5) + 10



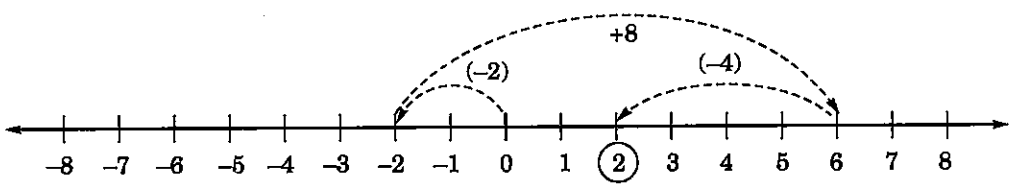
Hence, (– 5) + 10 = 5.

(e) (– 1) + (– 2) + (– 3)



Hence, (– 1) + (– 2) + (– 3) = (– 6).

(f) (– 2) + 8 + (– 4)



Hence, (– 2) + 8 + (– 4) = 2.

Q3. 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) 11 + (– 7) = 4 + (+ 7) + (– 7)

[∵ (+ 7) + (– 7) = 0]

= 4 + 0 = 4

Hence, 11 + (– 7) = 4.

(b) (– 13) + (+ 18) = (– 13) + (+ 13) + (+ 5)

[∵ (– 13) + (+ 13) = 0]

= 0 + (+ 5) = 5

Hence, (– 13) + (+ 18) = 5.

(c) (– 10) + (+19) = (– 10) + (+ 10) + (+ 9)

[∵ (– 10) + (10) = 0]

= 0 + (+ 9) = 9

Hence, (– 10) + (19) = 9.

(d) (– 250) + (+ 150) = (– 100) + (– 150) + (+ 150)

= (– 100) + 0 = – 100

[∵ (– 150) + (+ 150) = 0]

Hence, (– 250) + (+ 150) = – 100.

(e) (– 380) + (– 270) = – [380 + 270] = (– 650)

Hence, (– 380) + (– 270) = (– 650).

(f) (– 217) + (– 100) = – [217 + 100] = – 317

Q4. Find the sum of:

(a) 137 and – 354 (b) – 52 and 52

(d) – 312, 39 and 192 (d) –50, – 200 and 300

Sol. (a) 137 and – 354

(137) + (– 354) = (137) + (–137) + (– 217)

[∵ (137) + (– 137) = 0]

= 0 + (–217) = (– 217)

(b) – 52 and 52

(–52) + (+ 52) = 0 [∵ (– a) + (+ a) = 0]

(c) – 312, 39 and 192

(–312) + (+ 39) + (+ 192)

= (–231) + (– 81) + (+ 39) + (+ 192)

= (– 231) + (– 81) + (+ 231)

= (– 231) + (+ 231) + (– 81)

[∵ (– a) + (a) = 0]

= 0 + (– 81) = – 81

(*d*) – 50, – 200 and 300

(– 50) + (– 200) + (+ 300)

= (– 50) + (– 200) + (+ 200) + (+ 100)

= (– 50) + 0 + (+ 100)[∵ (– *a*) + (+ *a*) = 0]

= (– 50) + (+ 100) = (– 50) + (+ 50) + (+ 50)

= 0 + (+ 50) = 50 [∵ (– *a*) + (+ *a*) = 0]

Q5. Find the sum of:

(*a*) (– 7) + (– 9) + 4 + 16

(*b*) (37) + (– 2) + (– 65) + (– 18)

Sol. (*a*) (– 7) + (– 9) + 4 + 16

= (– 7) + (– 9) + 4 + (+ 7) + (+ 9)

= (– 7) + (+ 7) + (– 9) + (+ 9) + 4

= 0 + 0 + 4 = 4 [∵ (– *a*) + (*a*) = 0]

(*b*) (37) + (– 2) + (– 65) + (– 8)

= (+ 37) + (– 75)

= (+ 37) + (– 37) + (– 38)

= 0 + (– 38) = (– 38) [∵ (– *a*) + (+ *a*) = 0]

EXERCISE 6.3

Q1. Find:

(*a*) 35 – (20) (*b*) 72 – (90)

(*c*) (– 15) – (– 18) (*d*) (– 20) – (13)

(*e*) 23 – (– 12) (*f*) (– 32) – (– 40)

Sol. (*a*) 35 – (20) = 15 + (20) – (20)

= 15 + 0 = 15 [(+ *a*) + (– *a*) = 0]

(*b*) 72 – 90

72 – (72 + 18) = 72 – 72 – 18

= 0 – 18 = – 18 [*a* + (– *a*) = 0]

(*c*) (– 15) – (– 18)

= (– 15) + (additive inverse of – 18)

= (– 15) + (18) = 3

(*d*) (– 20) – (13)

(– 20) – (13) = – [20 + 13] = – 33

(*e*) 23 – (– 12)

23 – (– 12) = 23 + (additive inverse of – 12)

= 23 + 12 = 35

(*f*) (– 32) – (– 40)

(– 32) + (additive inverse of – 40)

= (– 32) + 40 = 8

Q2. 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)

Sol. (*a*) (– 3) + (– 6) = – [3 + 6] = – 9 and (– 3) – (– 6) = (– 3) + 6 = 3

Here, – 9 < 3 ∴ (– 3) + (– 6) < (– 3) – (– 6)

(*b*) (– 21) – (– 10) = (– 21) + 10 = – 11 and (– 31) + (– 11) = – (31 + 11) = – 42

Here, – 42 < – 11 or – 11 > – 42 ∴ (– 21) – (– 10) > (– 31) + (– 11)

(*c*) 45 – (– 11) = 45 + 11 = 56 and 57 + (– 4) = 57 – 4 = 53

Here, 56 > 53 ∴ 45 – (– 11) > 57 + (– 4)

(*d*) (– 25) – (– 42) = – 25 + 42 = 17

and (– 42) – (– 25) = – 42 + 25 = – 17

Here, 17 > – 17

∴ (– 25) – (– 42) > (– 42) – (– 25).

Q3. Fill in the blanks.

(*a*) (– 8) + ... = 0 (*b*) 13 + ... = 0

(*c*) 12 + (– 12) = ... (*d*) (– 4) + ... = – 12

(*e*) ..... – 15 = – 10.

Sol. (*a*) (– 8) + (additive inverse of – 8) = 0

= (– 8) + (8) = 0

∴ Value of blank is 8

(*b*) 13 + (additive inverse of 13) = 0

= 13 + (– 13) = 0

∴ Value of blank is – 13

(*c*) 12 + (– 12) = 0 [∵ – 12 is additive inverse of 12]

∴ The Value of blank is 0

(*d*) (– 4) + (– 8) = – [4 + 8] = – 12

∴ Value of blank is – 8.

(*e*) (+ 5) – 15 = – 10

∴ Value of blank is + 5.

Q4. 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

[∵ Additive inverse of – 25 is 25]

= – 7 + 17 = – 7 + 7 + 10

[∵ (– *a*) + (+ *a*) = 0]

= 0 + 10 = 10.

(*b*) (– 13) + 32 – 8 – 1

= (– 13) + (13) + 19 – (8 + 1)

= 0 + 19 – 9

= 19 – 9 [∵ (– 13) + (13) = 0]

= 10 + 9 – 9 = 10 + 0 = 10.

[(+ 9) – (+ 9) = 0]

(*c*) (– 7) + (– 8) + (– 90) = – (7 + 8) + (– 90)

= – 15 + (– 90) = – (15 + 90) = – 105.

(*d*) 50 – (– 40) – (– 2) = 50 – [– 40 – 2]

= 50 – (– 42) = 50 + 42

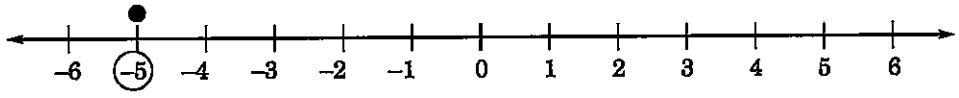
= 92.

Learning More Q & A

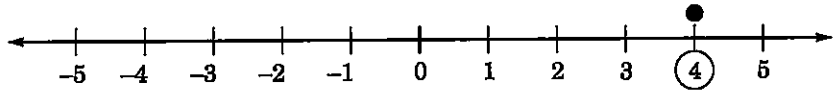
I. Very Short Answer (VSA) Questions

Q1. Represent the following on number line:
(*a*) – 5 (*b*) 4

Sol. (*a*) – 5



(*b*) 4



Q2. Identify the negative integers from the given numbers.
– 5, 3, 0, 5, – 6, 7, 3, 4, – 4, – 7

Sol. Negative integers are – 5, – 6, – 4 and – 7

Q3. What is the additive identity of – 20?

Sol. Additive identity of – 20 is 20.

Q4. What is negative of 0?

Sol. The negative of 0 is 0 itself.

Q5. What is the absolute value of |– 6|?

Sol. Absolute value of |– 6| is 6.

Q6. What is the absolute value of |0|?

Sol. Absolute value of |0| is 0.

Q7. What is the negative of – 13?

Sol. Negative of (– 13) is – (– 13) = 13.

Q8. What is the successor of – 7?

Sol. The successor of – 7 = – 7 + 1 = – 6

Q9. What is the predecessor of – 5?

Sol. The predecessor of – 5 is – 5 – 1 = – 6.

Q10. Write the opposite of 50 km towards north?

Sol. Opposite of 50 km towards north is 50 km towards south.

II. Short Answer (SA) Questions

Q11. Write the following integers in their increasing order.
– 3, 0, – 6, 5, – 4, 6, 3, – 8

Sol. The required increasing order is:
– 8, – 6, – 4, – 3, 0, 3, 5, 6

Q12. Comparing the following pairs of number use > or < .
(*a*) 0 ☐ – 6 (*b*) – 10 ☐ – 2
(*c*) – 100 ☐ 100 (*d*) 2 ☐ – 2

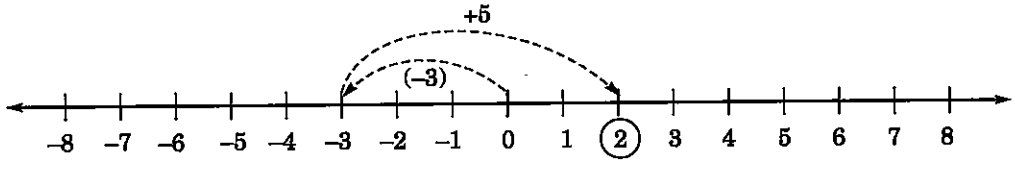
Sol. (*a*) 0 > – 6 (*b*) – 10 < – 2
(*c*) – 100 < 100 (*d*) 2 > – 2

Q13. Write all the integers between the following pair of integers:
(*a*) 0 and – 4 (*b*) – 5 and 5
(*c*) – 8 and – 13 (*d*) 3 and 6

Sol. (*a*) Integers between 0 and – 4 are:
– 3, – 2, – 1
(*b*) Integers between – 5 and 5 are:
– 4, – 3, – 2, – 1, 0, 1, 2, 3, 4
(*c*) Integers between – 8 and – 13 are:
– 12, – 11, – 10, – 9
(*d*) Integers between 3 and 6 are: 4 and 5

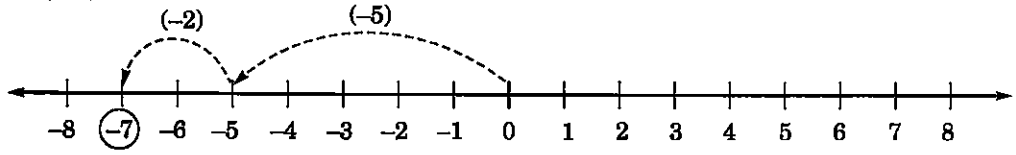
Q14. Find the solution of the following additions using number line:
(*a*) (– 3) + 5 (*b*) (– 5) + (– 2)

Sol. (– 3) + 5



∴ (– 3) + 5 = 2

(*b*) (– 5) + (– 2)



∴ (– 5) + (– 2) = (– 7)

Q15. Find the sum of the following integers:

(*a*) (– 8) + (+ 5) + (– 3) + (– 2)

(*b*) (– 7) + (– 9) + (+ 4) + (+ 3)

Sol. (*a*) (– 8) + (+ 5) + (– 3) + (– 2)

= (– 8) + (+ 5) – (3 + 2)

= (– 8) + (+ 5) – (5)

= (– 8) + 0 = – 8 [∵ (+ *a*) + (– *a*) = 0]

(*b*) (– 7) + (– 9) + (+ 4) + (+ 3)

= (– 7) + (– 9) + (4 + 3)

= (– 7) + (– 9) + (+ 7)

= (– 7) + (+ 7) + (– 9)

= 0 + (– 9) = – 9 [∵ (– *a*) + (+ *a*) = 0]

III. Long Answer (LA) Questions

Q16. Ramesh thinks of an integer. He subtracts 12 from it and gets the result as – 6. What was the integer he thought of?

Sol. The given sum can be written as under.

(———) – (12) = – 6

The required integer is 12 – 6 = 6.

Q17. Fill in the blanks:

(*a*) To subtract (– 8) from 13, we add ..... to 13.

(*b*) To subtract 5 from (– 12), we add ..... to (– 13)

(*c*) The negative of a negative integer is a ..... integer

(*d*) An integer when added to its opposite gives ..... as the sum.

(*e*) – 4 + ... = 1

(*f*) 4 – (– 3) = ...

(*g*) ..... + (– 79) = 19

Sol. (*a*) 8 (*b*) – 4 (*c*) positive

(*d*) 0 (*e*) 5 (*f*) 7 (*g*) 98

Q18. Determines:

(*a*) |5| – | – 3| (*b*) |5 – 6| + |– 1|

(*c*) – 7 + | – 3| (*d*) |5| + | – 12|

Sol. (*a*) |5| – | – 3| = 5 – 3 = 2

[∵ |*a*| = *a* and |– *a*| = *a*]

(*b*) |5 – 6| + |– 1| = |– 1| + |– 1| = 1 + 1 = 2

(*c*) – 7 + |– 3| = – 7 + 3 = – 4

(*d*) |5| + | – 12| = 5 + 12 = 17

IV. Higher Order Thinking Skills (HOTS) Questions

Q19. If * is an operation such that for two integers *p* and *q*, *p* * *q* = *p* + *q* – 2, then find:

(*a*) 6 * 2 (*b*) (– 2) * (– 3)

(*c*) (– 2) * (4) (*d*) (+ 3) * (– 1)

Sol. (*a*) Given that: *p* * *q* = *p* + *q* – 2

⇒ 6 * 2 = 6 + 2 – 2 = 6 + 0 = 6

Thus, 6 * 2 = 6.

(*b*) Given that: *p* * *q* = *p* + *q* – 2

⇒ (– 2) * (– 3) = (– 2) + (– 3) – 2

= – 5 – 2 = – 7.

Thus, (– 2) * (– 3) = – 7.

(*c*) Given that: *p* * *q* = *p* + *q* – 2

⇒ (– 2) * (4) = (– 2) + (4) – 2 = 2 – 2 = 0.

Thus, (– 2) * (4) = 0.

(*d*) Given that *p* * *q* = *p* + *q* – 2

⇒ (+ 3) * (– 1) = (+ 3) + (– 1) – 2 = 2 – 2 = 0

Thus, (+ 3) * (– 1) = 0.

Q20. Complete the table:

Second number

First number \ (–)	–3	–4	–2	0	–1	1
–2						
–3						
0						
+1						
–1						
–2						

Sol. The required table can be completed as under:

Second number

First number \ (–)	–3	–4	–2	0	–1	1
–2	1	2	0	–2	–1	–3
–3	0	1	–1	–3	–2	–4
0	3	4	2	0	1	–1
+1	4	5	3	1	2	0
–1	2	3	1	–1	0	–2
2	5	6	4	2	3	1

Test Yourself

I. Very Short Answer (VSA) Questions

1. Write opposite of the following:
   (*a*) 5 m north
   (*b*) 3 more than (– 2)
   (*c*) – 5°C
   (*d*) 30 m below the Earth.
2. Subtract (– 3) from (– 8).
3. Write the opposite of the following integers:
   (*a*) – 4 (*b*) 7 (*c*) 0 (*d*) – 100
4. Write the successors of the following integers.
   (*a*) – 12 (*b*) – 5 (*c*) 0 (*d*) – 1
5. Write any two numbers less than – 5.
6. Write the absolute values of the following integers:
   (*a*) |– 3| (*b*) |0|
   (*c*) |3| (*d*) |– 100|
7. Write the predecessor of the following integers:
   (*a*) – 4 (*b*) 0 (*c*) – 7 (*d*) – 6
8. Find the sum of the following integers:
   (*a*) (– 5) + (– 3) (*b*) (+ 10) + (– 15)
9. Subtract – 7 from – 8.
10. Find the value of: (– 12) + (+ 12) + (– 5) + (+ 5).

II. Short Answer (SA) Questions

11. Shashi thinks of an integer. She adds 7 to it and gets a sum as (– 2). What was the integer she thought of?
12. If profit is taken as positive (+), state the following as profit:
    (*a*) Profit of ₹ 120 (*b*) Loss of ₹ 36
13. Fill in the blanks:
    (*a*) Every negative integer is ..... than every positive number.
    (*b*) The natural numbers are called ..... integers.
    (*c*) Farther a number from 0 to the left ..... is its value.
    (*d*) Farther a number from 0 to the right ..... is its value.
    (*e*) The ..... negative integer is –1.
14. From the sum of 255 and – 183, subtract – 273.
15. Find:
    (*a*) 2 + (– 2) + 2 + (– 2) + 2 + (–2) + 2 + (– 2)
    (*b*) 2 – 3 + 4 – 5 + 6 – 7 + 8 – 9 + 10

ANSWERS

1. (*a*) 5 m south (*b*) 3 less than (– 2)
   (*c*) + 5°C (*d*) 30 m above the Earth
2. – 5
3. (*a*) 4 (*b*) – 7 (*c*) 0 (*d*) 100
4. (*a*) –11 (*b*) – 4 (*c*) 1 (*d*) 0
5. – 6 and – 7
6. (*a*) 3 (*b*) 0 (*c*) 3 (*d*) 100
7. (*a*) – 5 (*b*) – 1 (*c*) – 8 (*d*) – 7
8. (*a*) – 8 (*b*) – 5
9. – 1 10. 0 11. – 9
12. (*a*) (+ 120) (*b*) (– 36)
13. (*a*) less (*b*) positive
    (*c*) smaller (*d*) greater
    (*e*) greatest
14. 345 15. (*a*) 0 (*b*) 6

Internal Assessment

1. Fill in the blanks:
   (*a*) The greatest negative integer is ..... .
   (*b*) ..... is neither negative nor positive integer.
   (*c*) There are two integers between – 5 and ..... .
   (*d*) The negative of a negative integer is a ..... integer.
   (*e*) Opposite of – 5°C is ..... .
2. Subtract – 35 from 35.
3. Write > or < in ☐:
   (*a*) – 3 ☐ – 5 (*b*) 2 ☐ – 5
   (*c*) 0 ☐ 3 (*d*) – 1 ☐ – 4
4. Write the opposite of the following:
   (*a*) Late by 2 hours
   (*b*) 50 m below the Earth
   (*c*) 25 m towards south
   (*d*) 30 m towards west.

5. Complete the table:

Second number

First number +	–3	–2	–1	0	+1	+2	–4	+4
–2								
0								
+2								
–3								
+3								
+4								
–4								
–5								
+5								

ANSWERS

1. (*a*) – 1 (*b*) 0 (*c*) – 8
   (*d*) positive (*e*) 5°C
2. 70
3. (*a*) > (*b*) >
   (*c*) < (*d*) >
4. (*a*) early by 2 hours.
   (*b*) 50 m above the Earth
   (*c*) 25 m towards north
   (*d*) 30 m towards east.
5.

Second number

First number +	–3	–2	–1	0	+1	+2	–4	+4
–2	–5	–4	–3	–2	–1	0	–6	+2
0	–3	–2	–1	0	+1	+2	–4	+4
+2	–1	0	+1	+2	+3	+4	–2	+6
–3	–6	–5	–4	–3	–2	–1	–7	+1
+3	0	+1	+2	+3	+4	+5	–1	+7
+4	1	+2	+3	+4	+5	+6	0	+8
–4	–7	–6	–5	–4	–3	–2	–8	0
–5	–8	–7	–6	–5	–4	–3	–9	–1
+5	2	3	4	5	+6	+7	+1	+9