

Unit 1(Integers)

Multiple Choice Questions (MCQs)

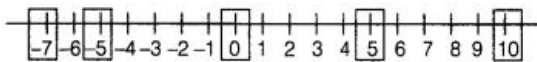
Question 1:

When the integers 10, 0, 5, -5,-7 are arranged in descending or ascending order, then find out which of the following integers always remains in the middle of the arrangement.

- (a) 0 (b) 5 (c) - 7 (d) -5

Solution:

(a) To arrange these integers in ascending or descending order, first we locate these points on number line.



As we know, if a point or number lies on the right side to the other number, then the number is greater. Then,

Ascending order -7, - 5,0, 5,10

Middle term = 0

Descending order → 10, 5, 0, - 5, - 7

Middle term = 0

Hence, zero always remains in the middle of the arrangement.

Question 2:

By observing the number line, state which of the following statements is not true?



- (a) B is greater than -10 (b) A is greater than 0 (c) B is greater than A (d) 6 is smaller than 0

Solution:

(c) As we know that, if a point or number lies on the right side to the other number, then the number is greater.

Here, B is greater than -10 but smaller than 0 and A is greater than 0 but smaller than 10.
Also, 6 is smaller than A.

Question 3:

By observing the above number line, state which of the following statements is true?

- (a) B is 2 (b) A is - 4 (c) S is -13 (d) B is - 4

Solution:

(d) Since, 8 lies at the left side of 0, so it will be negative and it is at 4th place.

So, $8 = -4$

Similarly, A lies at the right side of 0, so it will be positive and it is at 7th place.

So, $A = 7$. Hence, the value of $A - 7$ and value of $8 = - 4$.

Question 4:

Next three consecutive numbers in the pattern 11, 8, 5, 2, _____, __, __ are

- (a) 0, - 3, - 6 (b) -1, -5, -8 (c) - 2, - 5, - 8 (d) -1, -4, -7

Solution:

(d) By observing the series, difference between two consecutive numbers is 3,

i.e.

$$\begin{aligned} 11 - 8 &= 3 \\ 8 - 5 &= 3 \\ 5 - 2 &= 3 \end{aligned}$$

So, next number will be

$$2 - 3 = - 1$$

Similarly, next two numbers are

$$\begin{aligned} - 1 - 3 &= - 4 \\ - 4 - 3 &= - 7 \end{aligned}$$

Question 5:

The next number in the pattern - 62, - 37, - 12 is _____ .

- (a) 25 (b) 13 (c) 0 (d) -13

Solution:

(b) By observing the series, difference between two consecutive numbers is 25, i.e.

$$-37 - (-62) = -37 + 62 = 25$$

$$- 12 - (- 37) = -12 + 37 = 25$$

So, next number will be

$$-12 + 25 = 13$$

Question 6:

Which of the following statements is not true?

;

- (a) When two positive integers are added, we always get a positive integer.
- (b) When two negative integers are added, we always get a negative integer.
- (c) When a positive integer and a negative integer are added, we always get a negative integer.
- (d) Additive inverse of an integer 2 is (-2) and additive inverse of (-2) is 2.

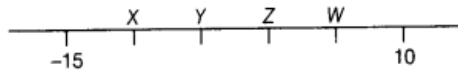
Solution:

(c)

- (a) True, when two positive integers are added, the resultant number is also a positive integer.
- (b) True, while adding integers, if both the numbers have same sign, the resultant number also get that sign.
- (c) False, while adding the integers of different signs, the resultant number get the sign of greater number.
- (d) True, additive inverse of an integer is the same integer value, with opposite sign.

Question 7:

On the following number line value, 'zero' is shown by the point



- (a) X
- (b) Y
- (c) Z
- (d) W

Solution:

- (c) All the points are equally spaced.
One division = 5 units

So, $X = -15 + 5 = -10$

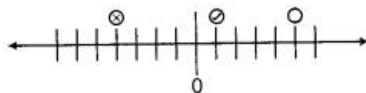
$Y = -10 + 5 = -5$

$Z = -5 + 5 = 0$

Hence, zero is shown by the point Z.

Question 8:

8 If \otimes , \circ , \ominus and \bullet represent some integers on number line, then descending order of these numbers is



- (a) $\bullet, \ominus, \otimes, \circ$
- (b) $\otimes, \bullet, \ominus, \circ$
- (c) $\circ, \ominus, \otimes, \bullet$
- (d) $\circ, \bullet, \otimes, \ominus$

Solution:

- (c) Descending order in number line, is from right to left.

Accordingly,

- \circ comes first
- \ominus comes second
- \otimes comes third
- \bullet comes fourth

Hence, descending order is $\circ, \ominus, \otimes, \bullet$.

Question 9:

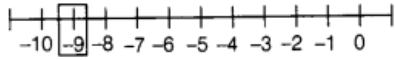
On the number line, the value of $(-3) \times 3$ lies on right hand side of

- (a) -10 (b) -4 (c) 0 (d) 9

Solution:

(a) $(-3) \times 3$ equals to -9 .

On the number line, it is shown as



So, as we can see -9 lies on the right hand side of -10 .

Question 10:

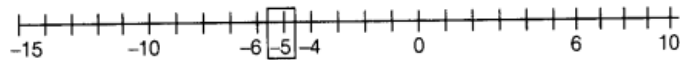
The value of $5 + (-1)$ does not lie between

- (a) 0 and -10 (b) 0 and 10 (c) -4 and -15 (d) -6 and 6

Solution:

(b) $5 + (-1)$ equals to 4 .

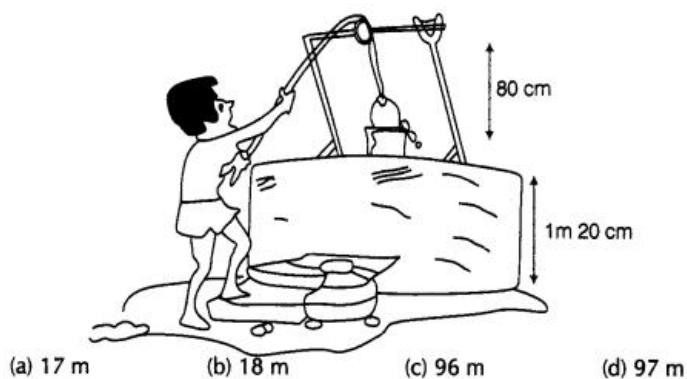
On the number line, it is placed as



Now, as we can see, 4 lies between $(0$ and $-10)$, $(-4$ and $-15)$ and $(-6$ and $6)$. But it does not lie between 0 and 10 .

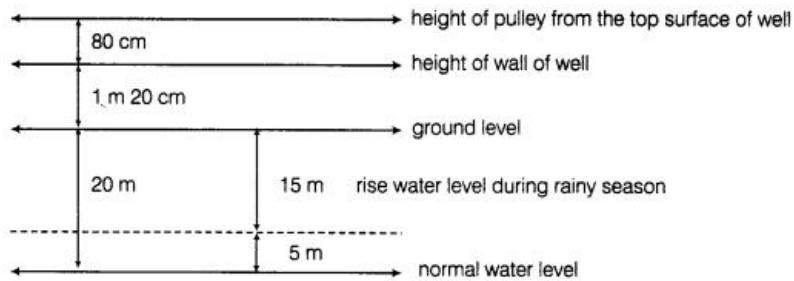
Question 11:

Water level in a well was 20 m below ground level. During rainy season, rainwater collected in different water tanks was drained into the well and the water level rises 5 m above the previous level. The wall of the well is 1 m 20 cm high and a pulley is fixed at a height of 80 cm. Raghu wants to draw water from the well. The minimum length of the rope, that he can use is



Solution:

(a) Details given in the question, can be described in the figure shown below



From the above figure, it is clear that,

Minimum length of the rope required to draw the water during the rainy season

= Distance between pulley and wall of well + Height of wall of well + Distance between water level during rainy season and ground level

$$= 80 \text{ cm} + 1 \text{ m } 20 \text{ cm} + 15 \text{ m}$$

$$= (0.8 + 1.2 + 15) \text{ m} \left[\because 1 \text{ cm} = \frac{1}{100} \text{ m} \Rightarrow 80 \text{ cm} = \frac{80}{100} \text{ m} = 0.80 \text{ m and } 1 \text{ m } 20 \text{ cm} = 1.20 \text{ m} \right]$$

$$= 17 \text{ m}$$

Question 12:

$(-11) \times 7$ is not equal to

- (a) $11 \times (-7)$ (b) $-(11 \times 7)$ (c) $(-11) \times (-7)$ (d) $7 \times (-11)$

Solution:

(c) $(-11) \times 7 = (-77)$ (we know, in multiplication, if sign of both numbers are different, then the sign of the resultant is negative and if sign of both numbers are same, then the sign of the resultant is positive.)

Option (a), $11 \times (-7) = -77$

Option (b), $-(11 \times 7) = -77$

Option (c), $(-11) \times (-7) = 77$

Option (d), $7 \times (-11) = -77$

Question 13:

$(-10) \times (-5) + (-7)$ is equal to

- (a) -57 (b) 57 (c) -43 (d) 43

Solution:

$$(d) (-10) \times (-5) + (-7) = \{(-10) \times (-5)\} + (-7) = 50 + (-7) = 50 - 7 = 43$$

Question 14:

Which of the following is not the additive inverse of a?

- (a) $-(-a)$ (b) $a \times (-1)$ (c) $-a$ (d) $a + (-1)$

Solution:

(a) Additive inverse of a is $(-a)$.

[additive inverse of an integer is the same integer value, with opposite sign]

So,

Option (a), $-(-a) = a$

Option (b), $a \times (-1) = -a$

Option (c), $-a$

Option (d), $a + (-1) = -a$

Question 15:

Which of the following is the multiplicative identity for an integer a ?

(a) a

(b) 1

(c) 0

(d) -1

Solution:

(b) Multiplicative identity for an integer a is 1 .

[\because a multiplicative identity is that identity in which any number is multiplied by that identity, it gives out the same number.]

Question 16:

$[(-8) \times (-3)] \times (-4)$ is not equal to

(a) $(-8) \times [(-3) \times (-4)]$

(b) $[(-8) \times (-4)] \times (-3)$

(c) $[(-3) \times (-8)] \times (-4)$

(d) $(-8) \times (-3) - (-8) \times (-4)$

Solution:

(d) $[(-8) \times (-3)] \times (-4) = [(-3) \times (-8)] \times (-4)$

[\because as multiplication is commutative, i.e. $a \times b = b \times a$]

$= (-3) \times [(-8) \times (-4)]$ [\because as multiplication is associative, i.e. $a \times (b \times c) = (a \times b) \times c$]

$= [(-8) \times (-4)] \times (-3)$

$= (-8) \times [(-4) \times (-3)]$

$= (-8) \times [(-3) \times (-4)]$

Hence, $[(-8) \times (-3)] \times (-4)$ is not equal to $(-8) \times (-3) - (-8) \times (-4)$.

Question 17:

$(-25) \times [6 + 4]$ is not same as

(a) $(-25) \times 10$

(b) $(-25) \times 6 + (-25) \times 4$

(c) $-25 \times 6 \times 4$

(d) -250

Solution:

(c) $(-25) \times [6 + 4] = (-25) \times 10$

Also, $(-25) \times [6 + 4] = -25 \times 6 + (-25) \times 4$

[using distributive property, i.e. $ax(b + c) = axb + axc$] $= -150 - 100 = -250$

Hence, $(-25) \times (6 + 4)$ is not same as $-25 \times 6 \times 4$.

Question 18:

-35×107 is not same as

(a) $-35 \times (100 + 7)$

(b) $(-35) \times 7 + (-35) \times 100$

(c) $-35 \times 7 + 100$

(d) $(-30 - 5) \times 107$

Solution:

(c) $-35 \times 107 = -35 \times (100+7) = (-35) \times 100 + (-35) \times 7$ [using distributive property, i.e. $a \times (b + c) = a \times b + a \times c$]
 $= (-35) \times 7 + (-35) \times 100$ [as addition is commutative, i.e. $a + b = b + a$]
Also, $-35 \times 107 = (-30 - 5) \times 107$ [$\therefore (-30 - 5) = (-35)$]
Hence, -35×107 is not same as $-35 \times 7 + 100$.

Question 19:

$(-43) \times (-99) + 43$ is equal to

- (a) 4300 (b) -4300 (c) 425 (d) -4214

Solution:

(a) $(-43) \times (-99) + 43 = (-1) (43) \times (-99) + 43$
 $= 43 \{-(-99) + 1\}$ [taking 43 as common]
 $= 43 (99 + 1) = 43 \times 100 = 4300$

Question 20:

$(-16) \div 4$ is not same as

- (a) $(-4) \div 16$ (b) $-(16 \div 4)$ (c) $16 \div (-4)$ (d) -4

Solution:

(a) $(-16) \div 4 = -(16 \div 4) = 16 \div (-4) = \frac{16}{-4} = -4$
But division is not commutative, hence
 $-16 \div 4 \neq (-4) \div 16$.

Question 21:

Which of the following does not represent an integer?

- (a) $0 \div (-7)$ (b) $20 \div (-4)$ (c) $(-9) \div 3$ (d) $(-12) \div 5$

Solution:

(d) An integer is a whole number (not a fractional number) that can be positive, negative or zero. So,

- (a) $\frac{0}{-7} = 0$ (b) $\frac{20}{-4} = -5$
(c) $\frac{-9}{3} = -3$ (d) $\frac{-12}{5}$ (not an integer)

Question 22:

Which of the following is different from the others?

- (a) $20 + (-25)$ (b) $(-37) - (-32)$
(c) $(-5) \times (-1)$ (d) $45 \div (-9)$

Solution:

(c) Option (a), $20 + (-25) = 20 - 25 = -5$

Option (b), $(-37) - (-32) = -37 + 32 = -5$

Option (c), $(-5) \times (-1) = 5$

Option (d), $(45) \div (-9) = 45/-9 = -5$

Question 23:

Which of the following shows the maximum rise in temperature?

(a) 23° to 32°

(b) -10° to 1°

(c) -18° to -11°

(d) -5° to 5°

Solution:

(b) Rise in temperature,

(a) $32^\circ - 23^\circ = 9^\circ$

(b) $1^\circ - (-10)^\circ = 1^\circ + 10^\circ = 11^\circ$ (maximum)

(c) $-11^\circ - (-18)^\circ = -11^\circ + 18^\circ = 7^\circ$

(d) $5^\circ - (-5^\circ) = 5^\circ + 5^\circ = 10^\circ$

Question 24:

If a and b are two integers, then which of the following may not be an integer?

(a) $a+b$

(b) $a-b$

(c) $a \times b$

(d) $a \div b$

Solution:

(d) Addition, subtraction and multiplication of two or more integers is always an integer. But, division of integers may or may not be an integer.

e.g. $2 \div 3 = 2/3$ (not an integer)

$3 \div 3 = 1$ (integer)

Question 25:

For a non-zero integer a, which of the following is not defined?

(a) $a \div 0$

(b) $0 \div a$

(c) $a \div 1$

(d) $1 \div a$

Solution:

(a) Division of any number by zero is not defined,

$a \div 0 =$ not defined

In questions 26 to 30, encircle the odd one of the following:

Question 26:

(a) $(-3,3)$

(b) $(-5,5)$

(c) (-6,1)

(d) (-8,8)

Solution:

(c) By observation, we can say that both the values are same in options (a), (b) and (d).
So, odd one is option (c).

Question 27:

(a) (-1,-2)

(b) (-5,2)

(c) (-4,1)

(d) (-9,7)

Solution:

(d) By observation, we can say that the sum of both values are same in options (a), (b) and (c).
So, odd one is option (d).

Question 28:

(a) $(-9) \times 5 \times 6 \times (-3)$

(b) $9 \times (-5) \times 6 \times (-3)$

(c) $(-9) \times (-5) \times (-6) \times 3$

(d) $9 \times (-5) \times (-6) \times 3$

Solution:

(d) (a) $(-9) \times 5 \times 6 \times (-3) = (-45) \times (-18) = 810$

(b) $9 \times (-5) \times 6 \times (-3) = (-45) \times (-18) = 810$

(c) $(-9) \times (-5) \times (-6) \times 3 = 45 \times (-18) = -810$

(d) $9 \times (-5) \times (-6) \times 3 = (-45) \times (-18) = 810$

So, odd one is option (c).

Question 29:

(a) $(-100) + 5$

(b) $(-81) + 9$

(c) $(-75) + 5$

(d) $(-32) + 9$

Solution:

(d) (a) $\frac{-100}{5} = -20$

(b) $\frac{-81}{9} = -9$

(c) $\frac{-75}{5} = -15$

(d) $\frac{-32}{9}$

Here, option (a), (b) and (c) are the negative integers, but option (d) is not the negative integer. So, odd one is option (d).

Question 30:

(a) $(-1) \times (-1)$

(b) $(-1) \times (-1) \times (-1)$

(c) $(-1) \times (-1) \times (-1) \times (-1)$

(d) $(-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1)$

Solution:

(a) $(-1) \times (-1) = 1$

(b) $(-1) \times (-1) \times (-1) = -1$

(c) $(-1) \times (-1) \times (-1) \times (-1) = 1$

(d) $(-1) \times (-1) \times (-1) \times (-1) \times (-1) \times (-1) = 1$

Hence, value of options (a), (c), (d) are same but value of option (b) is different.

Fill in the Blanks

In questions 31 to 71, fill in the blanks to make the statements true.

Question 31 :

$(-a) + b = b +$ additive inverse of ____ .

Solution:

Additive inverse is the negation of a number.

As we know, addition is commutative for integers, i.e. $-a + b = b + (-a)$

Now '- a' is the additive inverse of a. So, **a** will be the answer.

Question 32:

_____ $\div (-10) = 0$

Solution:

Division of 0 by any number, results as zero. So, the answer is 0.

Question 33:

$(-157) \times (-19) + 157 =$ _____ .

Solution:

$(-157) \times (-19) + 157 = (-1) \times (157) \times (-19) + 157$

$= 157 \{-(-19) + 1\}$ [taking 157 as common]

$= 157 \{19+1\} = 157 \times 20 = 3140$

Question 34:

$$[(-8) + \underline{\quad}] + \underline{\quad} = \underline{\quad} + [(-3) + \underline{\quad}] = -3$$

Solution:

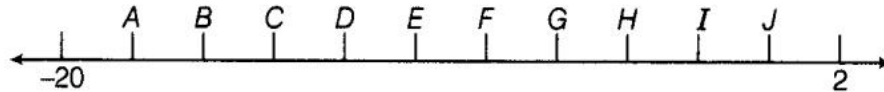
$$[(-8) + (-3)] + 8 = (-8) + [(-3) + 8]$$

[* addition is associative, i.e. $a + (b + c) = (a + b) + c$]

$$= -8 + 5 = -3$$

Question 35:

On the following number line, $(-4) \times 3$ is represented by the point _____ .



Solution:

$$(-4) \times 3 = (-12)$$

On the number line, each division has equal spacing of 2 units.

So,

$$A = -20 + 2 = -18$$

$$B = -18 + 2 = -16$$

$$C = -16 + 2 = -14$$

$$D = -14 + 2 = -12$$

Hence, $(-4) \times 3$ is represented by the point **D**.

Question 36:

If x , y and z are integers, then $(x + \underline{\quad}) + z = \underline{\quad} + (y + \underline{\quad})$

Solution:

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

$$\Rightarrow (x + y) + z = x + (y + z)$$

Question 37:

$$(-43) + \underline{\quad} = (-43)$$

Solution:

Zero (0) is an additive identity for integers, i.e. $a + 0 = 0 + a = a$ for any integer a .

$$\text{So, } (-43) + 0 = -43$$

Question 38:

$$(-8) + (-8) + (-8) = \underline{\quad} \times (-8)$$

Solution:

Let x be the missing number.

Let x be the missing number.

$$\text{Then, } -8 - 8 - 8 = x \times (-8)$$

$$\Rightarrow -24 = x \times (-8)$$

$$[\because -8 - 8 - 8 = -24]$$

$$\Rightarrow \frac{-24}{-8} = x$$

$$\Rightarrow x = 3$$

Hence, $(-8) + (-8) + (-8) = 3 \times (-8)$

Question 39:

$$11 \times (-5) = -(\quad \times \quad) = \quad$$

Solution:

We can write the equation as,

$$11 \times (-5) = -(11 \times 5) = -55$$

Question 40:

$$40 \times (-9) \times 20 = \quad$$

Solution:

$(-9) \times 20 = -180$ [\because in multiplication of integers, if both the numbers have different signs, then the result is a negative number]

Question 41:

$$(-23) \times (42) = (-42) \times \quad$$

Solution:

$$(-23) \times (42) = (-1) \times (23) \times (42) = (-1) \times (42) \times (23)$$

[\because multiplication is commutative, i.e. $a \times b = b \times a$] = $(-42) \times (23)$

Question 42:

While multiplying a positive integer and a negative integer, we multiply them as ___ numbers and put a ___ sign before the product.

Solution:

When multiplying a positive integer and a negative integer, we multiply them as whole numbers and put a negative sign before the product.

Question 43:

If we multiply ___ number of negative integers, then the resulting integer is positive.

Solution:

If we multiply **even** numbers of negative integers, then the resulting integer is positive

Question 44:

If we multiply six negative integers and six positive integers, then the resulting integer is ____ .

Solution:

If we multiply six negative integers and six positive integers, then the resulting integer is positive, because even numbers of negative integers, in multiplication becomes positive.

Question 45:

If we multiply five positive integers and one negative integer, then the resulting integer is ____ .

Solution:

If we multiply 5 positive integers and one negative integer, then the resulting integer is **negative**.

Question 46:

_____ is the multiplicative identity for integers.

Solution:

1 is the multiplicative identity for integers, i.e. $a \times 1 = 1 \times a = a$ for any integer a .

Question 47:

We get additive inverse of an integer **a**, when we multiply it by ____ .

Solution:

Additive inverse of an integer is the same integer value, with opposite sign. So, we get additive inverse of integer a , when we multiply it by **(- 1)**.

Question 48:

$(- 25) \times (- 2) =$ _____ .

Solution:

Two negative integers make the resultant integer, positive.

$$(- 25) \times (- 2) = 50$$

Question 49:

$$(-5) \times (-6) \times (-7) = \underline{\hspace{2cm}}.$$

Solution:

Odd negative integers make the resultant integer, negative.

$$(-5) \times (-6) \times (-7) = 30 \times (-7) = -210$$

Question 50:

$$3 \times (-1) \times (-15) = \underline{\hspace{2cm}}.$$

Solution:

Two negative integers and one positive integer make the resultant integer, positive.

$$3 \times (-1) \times (-15) = (-3) \times (-15) = 45$$

Question 51:

$$[12 \times (-7)] \times 5 = \underline{\hspace{2cm}} \times [(-7) \times \underline{\hspace{2cm}}]$$

Solution:

Multiplication is associative for integers, i.e.

$$(a \times b) \times c = a \times (b \times c)$$

$$\text{So, } [12 \times (-7)] \times 5 = \mathbf{12} \times [(-7) \times 5]$$

Question 52:

$$23 \times (-99) = \underline{\hspace{2cm}} \times (-100 + \underline{\hspace{2cm}}) = 23 \times \underline{\hspace{2cm}} + 23 \times \underline{\hspace{2cm}}$$

Solution:

We can write the equation as,

$$23 \times (-99) = 23 \times (-100 + 1) = 23 \times (-100) + 23 \times 1$$

[∴ integers show distributive property of multiplication over addition, i.e. $a \times (b + c) = a \times b + a \times c$]

Question 53:

$$35 \times (-1) = -35$$

Solution:

$$-35 \times (-1) = -35 \quad \left[\because \left(\frac{-35}{-1} \right) = 35 \right]$$

Question 54:

$$\underline{\hspace{2cm}} \times (-1) = 47$$

Solution:

$$(-47) \times (-1) = 47 \quad \left[\because \frac{47}{-1} = (-47) \right]$$

Question 55:

$$88 \times \underline{\quad} = -88$$

Solution:

$$88 \times (-1) = -88 \quad \left[\because \frac{-88}{88} = (-1) \right]$$

Question 56:

$$\underline{\quad} \times (-93) = 93$$

Solution:

$$(-1) \times (-93) = 93 \quad \left[\because \frac{93}{-93} = (-1) \right]$$

Question 57:

$$(-40) \times \underline{\quad} = 80$$

Solution:

$$(-40) \times (-2) = 80 \quad \left[\because \frac{80}{-40} = (-2) \right]$$

Question 58:

$$\underline{\quad} \times (-23) = -920$$

Solution:

$$(40) \times (-23) = -920 \quad \left[\because \left(\frac{-920}{-23} \right) = 40 \right]$$

Question 59:

When we divide a negative integer by a positive integer, we divide them as whole numbers and put a sign before quotient.

Solution:

When we divide a negative integer by a positive integer or a positive integer by a negative integer, we divide them as whole numbers and put a negative sign before quotient.

Question 60:

When (-16) is divided by the quotient is 4.

Solution:

When (-16) is divided by negative integer, i.e. -4 the quotient is 4 as both signs are cancelled out.

Question 61:

Division is the inverse operation of _____ .

Solution:

Division is the inverse operation of **multiplication**.

Question 62:

$$65 \div (-13) = \underline{\hspace{2cm}}.$$

Solution:

$$\begin{aligned} 65 \div (-13) &= 65 \times \frac{1}{(-13)} \quad [\because \text{division is inverse of multiplication}] \\ &= \mathbf{-5} \end{aligned}$$

Question 63:

$$(-100) \div (-10) = \underline{\hspace{2cm}}.$$

Solution:

$$\begin{aligned} (-100) \div (-10) &= (-100) \times \frac{1}{(-10)} \quad [\because \text{division is inverse of multiplication}] \\ &= \mathbf{(-10)} \end{aligned}$$

Question 64:

$$(-225) \div 5 = \underline{\hspace{2cm}}.$$

Solution:

$$\begin{aligned} (-225) \div 5 &= -225 \times \frac{1}{5} \quad [\because \text{division is inverse of multiplication}] \\ &= \mathbf{-45} \end{aligned}$$

Question 65:

$$\underline{\hspace{2cm}} \div (-1) = (-83)$$

Solution:

$$83 \div (-1) = -83 \quad \left[\because \frac{-83}{-1} = 83 \right]$$

Question 66:

$$\underline{\hspace{2cm}} \div (-1) = 75$$

Solution:

$$-75 \div (-1) = 75 \quad \left[\because \frac{75}{-1} = (-75) \right]$$

Question 67:

$$51 \div \underline{\hspace{2cm}} = (-51)$$

Solution:

$$51 \div (-1) = (-51) \quad [\because \frac{51}{-51} = (-1)]$$

Question 68:

$$113 \div \underline{\hspace{2cm}} = (-1)$$

Solution:

$$113 \div (-113) = (-1) \quad [\because \frac{113}{-113} = (-1)]$$

Question 69:

$$-95 \div (-1) = 95$$

Solution:

$$-95 \div (-1) = 95 \quad [\because \frac{-95}{-95} = (-1)]$$

Question 70:

$$(-69) \div 69 = \underline{\hspace{2cm}}.$$

Solution:

$$(-69) \div 69 = (-1)$$

Question 71:

$$(-28) \div (-28) =$$

Solution:

$$(-28) \div (-28) = 1$$

True/False

In questions 72 to 108, state whether the statements are True or False.

Question 72:

5 - (-8) is same as 5 + 8.

Solution:

True

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

Question 73:

$(-9) + (-11)$ is greater than $(-9) - (-11)$.

Solution:

False

$$(-9) + (-11) = -9 - 11 = -20$$

$$\text{and } (-9) - (-11) = -9 + 11 = 2$$

So, $(-9) - (-11)$ is greater than $(-9) + (-11)$.

Question 74:

Sum of two negative integers always gives a number smaller than both the integers.

Solution:

True

e.g. Taking two negative integers, i.e. (-5) and (-3) .

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

$$= -8 < -5 \text{ and } -8 < -3$$

Question 75:

Difference of two negative integers cannot be a positive integer.

Solution:

False

e.g. Taking two negative integers, i.e. -4 and -5 .

\Rightarrow

$$-4 - (-5) = -4 + 5 = 1$$

[positive integer]

Question 76:

We can write a pair of integers, whose sum is not an integer.

Solution:

False

Because, sum of two integers, is always be an integer.

Question 77:

Integers are closed under subtraction.

Solution:

True

Because, if we subtract two integers we get another integer.

Question 78:

$(-23) + 47$ is same as $47 + (-23)$.

Solution:

True

Because, addition is commutative, i.e. $a + b = b + a$

$$\Rightarrow (-23) + 47 = 47 + (-23)$$

Question 79:

When we change the order of integers their sum remains the same.

Solution:

True

Because, sum of two integers is commutative, i.e. $a + b = b + a$ for two integers a and b .

Question 80:

When we change the order of integers, their difference remains the same.

Solution:

False

Subtraction of two integers is not commutative, i.e. $a - b \neq b - a$ for two integers a and b .

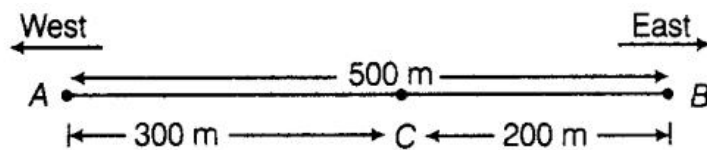
Question 81:

Going 500 m towards East first and then 200 m back, is same as going 200 m towards West first and then going 500 m back.

Solution:

True

Case I Going 500 m towards East first, i.e. point A to B and then 200 m back, i.e. B to C.



As per the above figure shown, final position is C, i.e. 300 m in East.

As per the above figure shown, final position is C, i.e. 300 m in East.

Question 82:

$$(-5) \times (33) = 5 \times (-33)$$

Solution:

True

$$\therefore \text{LHS} = (-5) \times 33 = (-165)$$

$$\text{and RHS} = 5 \times (-33) = (-165)$$

Hence, LHS = RHS

Question 83:

$$(-19) \times (-11) = 19 \times 11$$

Solution:

True

Product of two negative integers is a positive integer, i.e. $(-a) \times (-b) = a \times b$ where, a and b are positive integers.

$$\Rightarrow \text{LHS} = (-19) \times (-11) = 209$$

$$\text{RHS} = 19 \times 11 = 209 \text{ Hence,}$$

$$\text{LHS} = \text{RHS}$$

Question 84:

$$(-20) \times (5 - 3) = (-20) \times (-2)$$

Solution:

False

$$\therefore \text{LHS} = (-20) \times (5 - 3) = (-20) \times 2 = (-40)$$

$$\text{RHS} = (-20) \times (-2) = 40$$

Hence, LHS \neq RHS

Question 85:

$$4 \times (-5) = (-10) \times (-2)$$

Solution:

False

$$\therefore \text{LHS} = 4 \times (-5) = -20$$

$$\text{RHS} = (-10) \times (-2) = 20 \text{ Hence,}$$

$$\text{LHS} \neq \text{RHS}$$

Question 86:

$$(-1) \times (-2) \times (-3) = 1 \times 2 \times 3$$

Solution:

False

$$\therefore \text{LHS} = (-1) \times (-2) \times (-3) = (-6)$$

$$\text{RHS} = 1 \times 2 \times 3 = 6$$

Hence, LHS \neq RHS

Question 87:

$$(-3) \times 3 = (-12) - (-3)$$

Solution:

True

$$\therefore \text{LHS} = (-3) \times 3 = (-9)$$

$$\text{RHS} = (-12) - (-3) = (-12) + 3 = (-9)$$

Hence, LHS = RHS

Question 88:

Product of two negative integers is a negative integer.

Solution:

False

Product of two negative integers is a positive integer, i.e. $(-a) \times (-b) = ab$ where, a and b are two positive integers.

Question 89:

Product of three negative integers is a negative integer.

Solution:

True

Product of three negative integers is a negative integer, i.e.

$$(-a) \times (-b) \times (-c) = (-abc)$$

where, a, b and c are three positive integers.

Question 90:

90 Product of a negative integer and a positive integer is a positive integer.

Solution:

False

Product of a negative integer and a positive integer is a negative integer, i.e. $a \times (-b) = -ab$ where, a and b are two positive integers.

Question 91:

When we multiply two integers their product is always greater than both the integers.

Solution:

False

e.g. Let two integers are (-5) and 2.

$$\text{So, } (-5) \times 2 = -10$$

$$\Rightarrow (-10) < (-5) \text{ and } (-10) < 2.$$

Question 92:

Integers under multiplication.

Solution:

True

If we multiply two integers, we get an integer.

Question 93:

$(-237) \times 0$ is same as $0 \times (-39)$.

Solution:

True

When we multiply a number with 0, we always get 0.

$\Rightarrow (-237) \times 0 = 0$

Question 94:

Multiplication is not commutative for integers.

Solution:

False

Multiplication is commutative for integers, i.e. $axb = bxa$ for any two integers a and b .

Question 95:

(-1) is not a multiplicative identity of integers.

Solution:

True

1 is multiplicative identity for integers, i.e. $a \times 1 = 1 \times a = a$ for any integer a .

Question 96:

99×101 can be written as $(100 - 1) \times (100 + 1)$.

Solution:

True

$\therefore 99 \times 101 = 9999$

and $(100 - 1) \times (100 + 1) = 100 \times (100 + 1) - 1 \times (100 + 1)$

$= 100 \times 100 + 1 \times 100 - 1 \times 100 - 1 \times 1$ [using distributive property]

$= 10000 + 100 - 100 - 1 = 9999$

Question 97:

If a , b and c are integers and $b \neq 0$, then $a \times (b - c) = a \times b - a \times c$

Solution:

True

Multiplication can be distributive over subtraction,

i.e. $a \times (b-c) = a \times b - a \times c$

Question 98:

~~$(a + b) \times c = a \times c + a \times b$~~

Solution:

False

Integers show distributive property of multiplication over addition, i.e. $ax(b + c) = a \times b + a \times c$, where a, b and c are integers.

Question 99:

$a \times b = b \times a$

Solution:

True

Multiplication is commutative for integers, i.e. $a \times b = b \times a$ where, a and b are integers.

Question 100:

$a \div b = b \div a$

Solution:

False

Division is not commutative for integers, i.e. $a \div b \neq b \div a$ where, a and b are integers.

Question 101:

$a - b = b - a$

Solution:

False

Subtraction is not commutative for integers, i.e. $a - b \neq b - a$ where, a and b are integers.

Question 102:

$a + (-b) = -(a + b)$

Solution:

True

Division of a negative integer and a positive integer is always a negative integer

i.e. $\frac{a}{-b} = \frac{-b}{a} = -\left(\frac{a}{b}\right)$ where, a and b are integers.

Question 103:

$$a \div (-1) = -a$$

Solution:

True

$a \div (-1) = \frac{a}{(-1)} = -a$ [as division of a negative and positive integer is always negative]

Question 104:

Multiplication fact $(-8) \times (-10) = 80$ is same as division fact $80 \div (-8) = (-10)$.

Solution:

True

Multiplication fact

$$(-8) \times (-10) = 80$$

$$\text{LHS} = (-1) \times 8 \times (-1) \times 10$$

$$= (-1)(-1) \times 8 \times 10$$

$$= 1 \times 80 = 80 = \text{RHS}$$

Division fact

$$80 \div (-8) = (-10)$$

$$\text{LHS} = 80 \div (-8) = \frac{80}{-8}$$

$$= (-10) = \text{RHS}$$

Question 105:

Integers are closed under division.

Solution:

False

Because, when we divide two integers, we may or may not get an integer.

e.g. $2/1 = 2$ (integer) and $2/3$ (not an integer).

Question 106:

$$[(-32) \div 8] \div 2 = -32 \div [8 \div 2]$$

Solution:

False

$$\therefore \text{LHS} = [(-32) \div 8] \div 2 = \left[\frac{-32}{8} \right] \div 2 = -4 \div 2 = -2$$

$$\text{and RHS} = (-32) \div [8 \div 2] = (-32) \div \left[\frac{8}{2} \right] = (-32) \div 4 = \frac{-32}{4} = -8$$

Hence, $\text{LHS} \neq \text{RHS}$

Question 107:

The sum of an integer and its additive inverse is zero (0).

Solution:

True

Additive inverse is the number, that when added to a given number yields zero.

Question 108:

The successor of $0 \times (-25)$ is $1 \times (-25)$.

Solution:

False

We know that, successor means adding 1 to the given number.

Here, given number is $0 \times (-25) = 0$ [on multiplying by 0 to any number the result is zero]

Hence, the successor of $0 = 0 + 1 = 1$ but $1 \neq 1 \times (-25)$.

Question 109:

Observe the following patterns and fill in the blanks to make the statements true:

(a) $-5 \times 4 = -20$
 $-5 \times 3 = -15 = -20 - (-5)$
 $-5 \times 2 = \underline{\quad} = -15 - (-5)$
 $-5 \times 1 = \underline{\quad} = \underline{\quad}$
 $-5 \times 0 = 0 = \underline{\quad}$
 $-5 \times (-1) = 5 = \underline{\quad}$
 $-5 \times (-2) = \underline{\quad} = \underline{\quad}$

(b) $7 \times 4 = 28$
 $7 \times 3 = \underline{\quad} = 28 - 7$
 $7 \times 2 = \underline{\quad} = \underline{\quad} - 7$
 $7 \times 1 = 7 = \underline{\quad} - 7$
 $7 \times 0 = \underline{\quad} = \underline{\quad} - \underline{\quad}$
 $7 \times (-1) = -7 = \underline{\quad} - \underline{\quad}$
 $7 \times (-2) = \underline{\quad} = \underline{\quad} - \underline{\quad}$
 $7 \times (-3) \underline{\quad} = \underline{\quad} - \underline{\quad}$

Solution:

- (a) By observing the pattern, we find that 1st column is constant, i.e. -5 , 2nd column is decreasing by 1, 3rd column is increasing by 5, 4th column is also increasing by 5 and 5th column is constant, i.e. -5 . So, accordingly,

$$\begin{array}{l} \text{I} \quad \text{II} \quad \text{III} \quad \text{IV} \quad \text{V} \\ -5 \times 4 = -20 \\ -5 \times 3 = -15 = (-20) - (-5) \\ -5 \times 2 = -10 = (-15) - (-5) \\ -5 \times 1 = -5 = (-10) - (-5) \\ -5 \times 0 = 0 = (-5) - (-5) \\ -5 \times (-1) = 5 = 0 - (-5) \\ -5 \times (-2) = 10 = 5 - (-5) \end{array}$$

- (b) By observing the pattern, we find that 1st column is constant, i.e. 7 , 2nd column is decreasing by 1, 3rd column is decreasing by 7, 4th column is also decreasing by 7 and 5th column is constant, i.e. $+7$. So, accordingly,

$$\begin{array}{l} \text{I} \quad \text{II} \quad \text{III} \quad \text{IV} \quad \text{V} \\ 7 \times 4 = 28 \\ 7 \times 3 = 21 = 28 - 7 \\ 7 \times 2 = 14 = 21 - 7 \\ 7 \times 1 = 7 = 14 - 7 \\ 7 \times 0 = 0 = 7 - 7 \\ 7 \times (-1) = (-7) = 0 - 7 \\ 7 \times (-2) = (-14) = (-7) - 7 \\ 7 \times (-3) = (-21) = (-14) - 7 \end{array}$$

Question 110:

Science Application An atom consists of charged particles called electrons and protons. Each proton has a charge of $+1$ and each electron has a charge of -1 . Remember number of electrons is equal to number of protons, while answering these questions:

- (a) What is the charge on an atom?
 (b) What will be the charge on an atom, if it loses an electron?
 (c) What will be the charge on an atom, if it gains an electron?

Solution:

- (a) Let a be the number of electrons in an atom.

Number of protons in the atom, will also be equal to a . Since, an atom has equal number of protons and electrons.

∴ Charge on one electron = (-1)

∴ Total charge in a electrons = $a \times (-1) = -a$

∴ Charge on one proton = $(+1)$

∴ Total charge in a protons = $a \times (+1) = +a$

Hence, total charge on the atom = Charge of electrons + Charge of protons
 $= -a + a = 0$

- (b) If an atom loses an electron, it will have $(a - 1)$ electrons and a protons.

∴ Charge in one electron = (-1)

∴ Charge in $(a - 1)$ electrons = $(a - 1) \times (-1) = -(a - 1) = (1 - a)$

∴ Charge in one proton = $(+1)$

∴ Charge in a protons = $(+1) \times a = (+a)$

Hence, total charge on the atom = Charge of electrons + Charge of protons
 $= 1 - a + a = +1$

- (c) If an atom gains an electron, it will have $(a + 1)$ electrons and a protons

∴ Charge in one electron = -1

Charge in (a + 1) electrons = $-1 \times (a + 1) = -(a + 1)$

∴ Charge in one proton = (+1)

Charge in a protons = $(+1) \times a = (+ a)$

Hence, total charge on the atom = Charge of electrons + Charge of protons

= $a - (a + 1) = (-1)$

Question 111:

An atom changes to a charged particle called ion, if it loses or gains electrons. The charge on an ion is the charge on electrons plus charge on protons. Now, write the missing information in the table given below:

Name of ion	Proton charge	Electron charge	Ion charge
(a) Hydroxide ion	+9	—	-1
(b) Sodium ion	+11	—	+1
(c) Aluminium ion	+13	-10	—
(d) Oxide ion	+8	-10	—

Solution:

(a) For Hydroxide ion,

Proton charge + Electron charge = Ion charge

Electron charge = Ion charge – Proton charge

Electron charge = $-1 - 9 = -10$

Hence, the electron charge in a Hydroxide ion is -10.

(b) For Sodium ion,

Electron charge = Ion charge – Proton charge = $+1 - 11 = -10$

Hence, the electron charge in a Sodium ion is -10.

(c) For Aluminium ion,

Ion charge = Proton charge + Electron charge

Ion charge = $13 - 10 = 3$

Hence, the ion charge in an Aluminium ion is 3,

(d) For Oxide ion,

Ion charge = Proton charge + Electron charge

Ion charge = $8 - 10 = -2$

Hence, the ion charge in an Oxide ion is -2.

Question 112:

Social Studies Application remembering that 1AD came immediately after 1 BC, while solving following problems take 1BC as -1 and 1AD as + 1.

(a) The Greco-Roman era, when Greece and Rome ruled Egypt, started in the year 330 BC and ended in the year 395 AD. How long did this era last?

(b) haskaracharya was born in the year 1114 AD and died in the year 1185 AD. What was his age when he died?

(c) Turks ruled Egypt in the year 1517 AD and Queen Nefertis ruled . Egypt about 2900 years, before the Turks ruled. In what year did she rule?

(d) Greek Mathematician Archimedes lived between 287 BC and 212 BC and Aristotle lived between 380 BC and 322 BC. Who lived during an earlier period?

Solution:

(a) Total duration of the era = End year – Start year
= (395 AD) – (330 BC)
= + 395 – (– 330)
= 395 + 330 = 725 yr

Hence, total duration of this era was 725 yr.

(b) Age, when Bhaskaracharya died = Year in which he died – Year in which he born
= (1185 AD) – (1114 AD)
= (+ 1185) – (+ 1114)
= 1185 – 1114 = 71 yr

Hence, Bhaskaracharya was died in the age of 71 yr.

(c) Year in which Queen Nefertis ruled = Year in which Turks ruled – 2900 yr
= (1517 AD) – 2900
= (+ 1517) – 2900
= – 1383 = 1383 BC

Hence, Queen Nefertis ruled in the year 1383 BC.

(d) Aristotle lived in an earlier period, as 380 BC and 322 BC is earlier than 287 BC and 212 BC.

Question 113:

The table shows the lowest recorded temperatures for each continent. Write the continents in order from the lowest recorded temperature to the highest recorded temperature.

The Lowest Recorded Temperatures	
Continent	Temperature (In Fahrenheit)
Africa	– 11°
Antarctica	– 129°
Asia	– 90°
Australia	– 9°
Europe	– 67°
North America	– 81°
South America	– 27°

Solution:

Lowest to heights (ascending order) in a negative number, the number that has greater value of actually smaller and vice-versa.

So, accordingly, we arrange them in ascending order

$$\text{Antarctica} < \text{Asia} < \text{North America} < \text{Europe} < \text{South America} < \text{Africa} < \text{Australia}$$

(–129°) (–90°) (–81°) (–67°) (–27°) (–11°) (–9°)

Question 114:

Write a pair of integers whose product is -12 and there lies seven integers between them (excluding the given integers).

Solution:

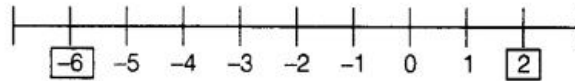
For a pair of integers, whose product is -12 and there lies seven integers between them, Two

solutions are possible, i.e. (-6 and 2) and (-2 and 6).

$$\Rightarrow -6 \times 2 = -12, -2 \times 6 = -12$$

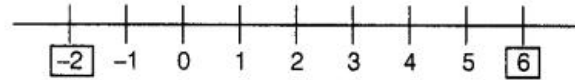
Ist Pair Let first integer = -6 and second integer = 2

$\Rightarrow (-6) \times 2 = (-12)$ and 7 integers are lying between them.



IInd Pair Let first integer = -2 and second integer = 6

$\Rightarrow (-2) \times 6 = -12$ and 7 integers are lying between them.



Question 115:

From given integers in Column I, match an integer of Column II, so that their product lies between -19 and -6.

Column I	Column II
-5	1
6	-1
-7	3
8	-2

Solution:

$-5 \times 3 = (-15)$ which lies between -19 and -6.

$6 \times (-2) = (-12)$ which lies between -19 and -6.

$-7 \times 1 = (-7)$ which lies between -19 and -6.

$8 \times (-1) = (-8)$ which lies between -19 and -6.

Question 116:

Write a pair of integers, whose product is -36 and whose difference is 15.

Solution:

For a pair of integers, whose product is -36 and difference is 15, one possible solution is (-3, 12).

So, first integer = -3 and second integer = 12

Their product = $(-3) \times 12 = -(3 \times 12) = -36$

and the difference between these two integers is $12 - (-3) = 15$.

Question 117:

Match the following:

Column I	Column II
(a) $a \times 1$	(i) Additive inverse of a
(b) 1	(ii) Additive identity
(c) $(-a) + (-b)$	(iii) Multiplicative identity
(d) $a \times (-1)$	(iv) $a + (-b)$
(e) $a \times 0$	(v) $a + b$
(f) $(-a) + b$	(vi) a
(g) 0	(vii) $-a$
(h) $a + (-a)$	(viii) 0
(i) $-a$	(ix) -1

Solution:

- (a) \rightarrow (vi)
 $a \times 1 = a$
- (b) \rightarrow (iii)
 1 is multiplicative identity.
- (c) \rightarrow (v)
 $-a + (-b) = a + b$ [both signs are cancelled with each other]
- (d) \rightarrow (vii)
 $a \times (-1) = -a$
- (e) \rightarrow (viii)
 $a \times 0 = 0$ [any value, when multiplies with 0 becomes zero]
- (f) \rightarrow (iv)
 $(-a) + b = a + (-b)$
- (g) \rightarrow (ii)
 0 is an additive identity.
- (h) \rightarrow (ix)
 $a + (-a) = \frac{a}{-a} = -1$
- (i) \rightarrow (i)
 $-a$ is additive inverse of a .

Question 118:

You have Rs. 500 in your saving account at the beginning of the month.

The record below, shows all of your transactions during the month. How much money is in your account after these transactions?

Cheque no.	Date	Transaction description	Payment	Deposit
384102	4/9	Jal Board	? 120	? 200
275146	12/9	Deposit		
384103	22/9	LIC India	? 240	? 150
801351	29/9	Deposit		

How much money is in your account after these transactions?

Solution:

According to the question,

Already available amount = Rs. 500

On 4/9 with cheque number 384102 withdraw Rs. 120.

Also, with cheque number 275146 on 12/9 deposited amount was Rs. 200.

In the same way, on 22/9 with cheque number 384103, Rs. 240 paid to LIC of India, also.

On 29/9 with cheque number 801351, deposited amount was Rs. 150.

Thus, net amount available in bank account will be

= Already saved amount + Deposited amount – Debited amount (paid amount)

= 500 + 200 + 150 - 120 - 240

= 850 + (- 360) = Rs. 490

Question 119:

(a) Write a positive integer and a negative integer whose sum is a negative integer.

Solution:

A number of solutions can be possible.

e.g. Let first integer = 4 and second integer = (-6)

Sum = $4 + (-6) = -2$ [negative integer]

(b) Write a positive integer and a negative integer whose sum is a positive integer.

Solution:

A number of solutions can be possible.

e.g. Let first integer = 8 and second integer = -2

Sum = $8 + (-2) = 6$ [positive integer]

(c) Write a positive integer and a negative integer whose difference is a negative integer.

Solution:

A number of solutions can be possible.

e.g. Let first integer = (-7) and second integer = 2

Difference = $(-7 - 2) = (-9)$ [negative integer]

(d) Write a positive integer and a negative integer whose difference is a positive integer.

Solution:

A number of solutions can be possible.

e.g. Let first integer = 4 and

second integer = (-3) [positive integer]

(e) Write two integers, which are smaller than -5 but their difference is -5.

Solution:

For two integers, which are smaller than -5 but their difference is -5.

Let first integer = -11 and second integer = (-6) [∵ -11 < (-5) and -6 < (-5)]

Difference = $-11 - (-6) = -11 + 6 = (-5)$

(f) Write two integers which are greater than -10 but their sum is smaller than -10.

Solution:

For two integers which are greater than -10 but their sum is smaller than -10.

Let first integer = -4 and second integer = -7 [*] -4 > (-10) and -7 > -10]

$$\text{Sum} = -4 + (-7) = -11 < -10$$

(g) Write two integers which are greater than -4 but their difference is smaller than -4.

Solution:

For two integers which are greater than -4 but their difference is smaller than -4.

Let first integer = (-1) and second integer = 4 [*] -1 > -4 and 4 > -4]

$$\text{Difference} = -1 - 4 = -5 < (-4)$$

(h) Write two integers which are smaller than -6 but their difference is greater than -6.

Solution:

For two integers which are smaller than -6 but their difference is greater than -6.

e.g. Let first integer = (-8) and second integer = (-9) [*] -8 < -6 and -9 < -6]

$$\text{Difference} = -8 - (-9) = -8 + 9 = 1 > (-6)$$

(i) Write two negative integers whose difference is 7.

Solution:

A number of solutions can be possible.

e.g. Let first integer = (-3) and second integer = (-10)

$$\text{Difference} = -3 - (-10) = 7$$

(j) Write two integers, such that one is smaller than -11 and other is greater than -11 but their difference is -11.

Solution:

For two integers, such that one is smaller than -11 and other is greater than -11.

Let first integer = -20 and second integer = -9 [*] -20 < -11 and -9 > -11]

$$\text{Difference} = -20 - (-9) = (-11)$$

(k) Write two integers whose product is smaller than both the integers.

Solution:

A number of solutions can be possible.

e.g. Let first integer = -3 and second integer = 5

$$\text{Product} = -3 \times 5 = -15 \quad [*] -15 < -3 \text{ and } -15 < 5]$$

(l) Write two integers, whose product is greater than both the integers.

Solution:

A number of solutions can be possible.

e.g. Let first integer = 4 and second integer = 6

Product = $6 \times 4 = 24$

[∴ $-24 > 6$ and $24 > 4$]

Question 120:

What's the error? Ramu evaluated the expression $-7 - (-3)$ and came up with the answer -10 . What did Ramu do wrong?

Solution:

Ramu went wrong in solving $-(-3)$ and took it as -3 only.

Correct answer = $-7 - (-3) = -7 + 3 = -4$

Question 121:

What's the error? Reeta evaluated $-4 + d$ for $d = -6$ and gave an answer of 2. What might Reeta have done wrong?

Solution:

Reeta went wrong in solving $+(-6)$ and took it as $+6$.

Correct answer = $-4 + d = -4 + (-6) = -4 - 6 = -10$

Question 122:

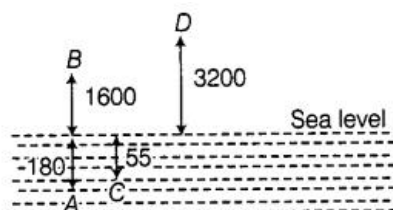
The table given below, shows the elevations relative to sea level of four locations. Taking sea level as zero (0), answer the following questions.

Location	Elevation (in m)
A	-180
B	1600
C	-55
D	3200

- (a) Which location is closest to sea level?
- (b) Which location is farthest from sea level?
- (c) Arrange the locations from the least to the greatest elevation.

Solution:

- (a) From the adjacent figure, we can clearly see that C is closest to sea level.
- (b) D is farthest from sea level.
- (c) Locations from the least to the greatest elevation will be in the order A, C and D.



Question 123:

You are at an elevation 380 m above sea level as you start a motor ride. During the ride, your elevation changes by the following metres 540 m, -268 m, 116 m, -152 m, 490 m, -844 m, 94 m. What is your elevation relative to the sea level at the end of the ride?

Solution:

As per the given information, initial position of motor was 380 m.

During the ride, change in elevation was 540 m, -268 m, 116 m, -152 m, 490 m, -844 m and 94 m.

Net change in position = $540 + (-268) + (116) + (-152) + (490) + (-844) + 94 = -24$ m Initial position was 380 m. So, at the end of the ride the position would be = $380 + (-24) = 356$ m

Question 124:

Evaluate the following, using distributive property.

- (i) -39×99 (ii) $(-85) \times 43 + 43 \times (-15)$
(iii) $53 \times (-9) - (-109) \times 53$ (iv) $68 \times (-17) + (-68) \times 3$

Solution:

$$\begin{aligned} \text{(i)} \quad -39 \times 99 &= (-40 + 1) \times (100 - 1) \\ &= -40 \times (100 - 1) + 1 \times (100 - 1) \\ \text{Now, using distributive property,} \\ &= (-40 \times 100) + (-1 \times -40) + (1 \times 100) + (1 \times -1) \quad [\because a \times (b + c) = a \times b + a \times c] \\ &= -4000 + 40 + 100 - 1 = -3861 \end{aligned}$$

$$\begin{aligned} \text{(ii)} \quad (-85) \times 43 + 43 \times (-15) \\ \text{Taking 43 as common} \\ &= 43 \times (-85 - 15) \quad [\because a \times b + a \times c = a \times (b + c)] \\ &= 43 \times (-100) = -4300 \end{aligned}$$

$$\begin{aligned} \text{(iii)} \quad 53 \times (-9) - (-109) \times 53 \\ \text{Taking 53 as common,} \\ &= 53 \times [-9 - (-109)] \\ &= 53 \times (-9 + 109) = 53 \times 100 = 5300 \quad [\because a \times b + a \times c = a \times (b + c)] \end{aligned}$$

$$\begin{aligned} \text{(iv)} \quad 68 \times (-17) + (-68) \times 3 \\ &= 68 \times (-17) - 68 \times 3 \\ \text{Taking 68 as common,} \\ &= 68 \times (-17 - 3) \quad [\because a \times b + a \times c = a \times (b + c)] \\ &\quad \text{[i.e. using distributive property]} \\ &= 68 \times (-20) \\ &= -1360 \end{aligned}$$

Question 125:

If '*' is an operation have, such that for integers a and b. We have $a*b = a \times b + (a \times a + b \times b)$, then find

- (i) $(-3)*(-5)$ (ii) $(-6)*2$

Solution:

$$\begin{aligned} \text{(i)} \quad \text{We have, } a*b &= a \times b + (a \times a + b \times b) \\ \text{Now, put } a &= (-3) \text{ and } b = (-5) \\ (-3)*(-5) &= (-3) \times (-5) + [(-3) \times (-3) + (-5) \times (-5)] \\ &= 15 + (9 + 25) = 15 + 34 = 49 \end{aligned}$$

$$\begin{aligned} \text{(ii) Now, put } a &= -6 \text{ and } b = 2 \\ (-6) \times 2 &= (-6 \times 2) + \{(-6) \times (-6) + 2 \times 2\} \\ &= -6 \times 2 + (36 + 4) = -12 + 40 = 28 \end{aligned}$$

Question 126:

If Δ is an operation, such that for integers a and b . We have $a \Delta b = a \times b - 2 \times a \times b + b \times b(-a) \times b + b \times b$, then find

$$\text{(i) } 4 \Delta (-3) \qquad \text{(ii) } (-7) \Delta (-1)$$

Also, show that $4 \Delta (-3) \neq (-3) \Delta 4$ and $(-7) \Delta (-1) \neq (-1) \Delta (-7)$

Solution:

(i) We have, $a \Delta b = a \times b - 2 \times a \times b + b \times b(-a) \times b + b \times b$

Now, put $a = 4$ and $b = (-3)$

$$\begin{aligned} 4 \Delta (-3) &= 4 \times (-3) - 2 \times 4 \times (-3) + (-3) \times (-3) \times (-4) \times (-3) + (-3) \times (-3) \\ &= -12 - 2 \times (-12) + (9)(12) + 9 = -12 + 24 + 108 + 9 \\ &= 129 \end{aligned}$$

Now, put $a = -3$ and $b = 4$

$$\begin{aligned} \Rightarrow (-3) \Delta 4 &= (-3) \times 4 - 2 \times (-3) \times (4) + 4 \times 4 \{ -(-3) \} \times 4 + 4 \times 4 \\ &= (-12) + 24 + 16(3) \times 4 + 16 \\ &= (-12) + 24 + 192 + 16 \\ &= 220 \end{aligned}$$

Clearly, $4 \Delta (-3) \neq (-3) \Delta 4$

(ii) Now, put $a = (-7)$ and $b = (-1)$

$$\begin{aligned} \Rightarrow (-7) \Delta (-1) &= (-7) \times (-1) - 2 \times (-7) \times (-1) + (-1) \times (-1) \{ -(-7) \} \times (-1) + (-1) \times (-1) \\ &= 7 - 14 + 1 \times 7 \times (-1) + 1 \\ &= 7 - 14 - 7 + 1 \Rightarrow -13 \end{aligned}$$

Now, put $a = (-1)$ and $b = (-7)$

$$\begin{aligned} \Rightarrow (-1) \Delta (-7) &= (-1) \times (-7) - 2 \times (-1) \times (-7) + (-7) \times (-7) \{ -(-1) \} \times (-7) + (-7) \times (-7) \\ &= 7 - 14 + 49(1) \times (-7) + 49 \\ &= 7 - 14 - 343 + 49 \\ &= -301 \end{aligned}$$

Clearly, $(-7) \Delta (-1) \neq (-1) \Delta (-7)$

Question 127:

Below u , v , w and x represent different integers, where $u = (-4)$ and $x \neq 1$. By using following equations, find each of the values

$$u \times v = u, \quad x \times w = w \text{ and } u + x = w$$

$$\text{(a) } v \qquad \text{(b) } w \qquad \text{(c) } x$$

Explain your reason, using the properties of integers

Solution:

We have, three equations

$$u \times v = u \quad \dots(i)$$

$$x \times w = w \quad \dots(ii)$$

$$u + x = w \quad \dots(iii)$$

and $u = -4$

(a) By putting the value of u in Eq. (i), we get

$$\begin{aligned} (-4) \times v &= (-4) \\ \Rightarrow v &= \frac{(-4)}{(-4)} \Rightarrow v = 1 \end{aligned}$$

(b) From Eq. (ii),

$$x \times w = w \Rightarrow x = \frac{w}{w} \Rightarrow x = 1$$

But, $x \neq 1$

Hence, $x \times w = w$, (ii) is possible, when $w = 0$ ($x \neq 1$).

(c) From Eq. (iii), $u + x = w$

Put $u = -4$ and $w = 0$, we get

$$\Rightarrow -4 + x = 0 \Rightarrow x = 4$$

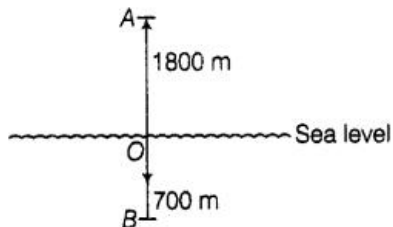
$$\therefore v = 1, x = 4 \text{ and } w = 0$$

Question 128:

Height of a place A is 1800 m above sea level. Another place B is 700 m below sea level. What is the difference between the levels of these two places?

Solution:

As per the given information, we can draw the diagram,



Let O be the point of level of sea.

Difference between these two points, A and B

$$= \text{Height between sea level and point A} + \text{Height between point B and sea level} = AO + OB = 1800 + 700 = 2500 \text{ m}$$

Question 129:

Gas	Freezing point at sea level ($^{\circ}\text{F}$)	Freezing point at sea level ($^{\circ}\text{C}$)
Hydrogen	- 435	
Krypton	- 251	
Oxygen	- 369	
Helium	- 458	
Argon	- 309	

Solution:

We have, $C = \frac{5}{9}(F - 32)$

For Hydrogen, put $F = (-435)$

$$\Rightarrow C = \frac{5}{9}(-435 - 32) = \frac{5}{9} \times (-467) = -259.44$$

$$\Rightarrow C = -259.44$$

For Krypton, put $F = (-251)$

$$\Rightarrow C = \frac{5}{9}(-251 - 32) = \frac{5}{9} \times (-283) = -157.22$$

$$\Rightarrow C = -157.22$$

For Oxygen, put $F = (-369)$

$$C = \frac{5}{9}(-369 - 32) = \frac{5}{9} \times (-401)$$

$$\Rightarrow C = -222.7$$

$$\Rightarrow C = -223$$

For Helium, put $F = (-458)$

$$C = \frac{5}{9}(-458 - 32) = \frac{5}{9} \times (-490) = -272.22$$

$$C = -272.22$$

For Argon, put $F = (-309)$

$$C = \frac{5}{9}(-309 - 32) = \frac{5}{9} \times (-341) = -189.44$$

$$\Rightarrow C = -189.44$$

Question 130:

Sana and Fatima participated in an apple race. The race was conducted in 6 parts. In the first part, Sana won by 10 seconds. In the second part, she lost by 1 min, then won by 20 seconds in the third part and lost by 25 seconds in the fourth part, she lost by 37 seconds in the fifth part and won by 12 seconds in the last part. Who won the race finally?

Solution:

Let difference in time denoted by positive, when Sana wins the race and negative, when Sana loses the race.

Total difference in time taken by Sana in all the six parts

$$= 10 - 60 + 20 - 25 - 37 + 12 = -80s \quad [\because 1 \text{ min} = 60s]$$

Hence, Fatima won the race by 80 s.

Question 131:

131 A green grocer had a profit of Rs. 47 on Monday, a loss of Rs. 12 on Tuesday and loss of Rs. 8 on Wednesday. Find his net profit or loss in 3 days.

Solution:

As per the given information,

Profit on Monday = Rs. 47 and loss on Tuesday = Rs. 12

and loss on Wednesday = Rs. 8

$$\therefore \text{Net profit} = \text{Total profit} - \text{Total loss}$$

Now, total profit = Rs. 47 and total loss = 12 + 8 = 20

$$\therefore \text{Net profit} = 47 - 20 = \text{Rs. } 27$$

Question 132:

In a test, +3 marks are given for every correct answer and -1 mark are given for every incorrect answer. Sona attempted all the questions and scored +20 marks, though she got 10 correct answers.

- (i) How many incorrect answers has she attempted?
 (ii) How many questions were given in the test?

Solution:

Let x be the correct answers and y be the incorrect answers, given by Sona.

It is given that, if she gives 10 correct answers and her score is 20. Since, for every correct answer, +3 is given and for every incorrect answer, -1 is given.

Hence,

$$(i) 3 \times (\text{Correct answer}) + (-1) \times (\text{Incorrect answer}) = \text{Total score}$$

$$\Rightarrow 3 \times 10 + (-1) \times y = 20$$

$$\Rightarrow 30 - y = 20$$

$$\Rightarrow 30 - 20 = y$$

$$\Rightarrow y = 10$$

$$(ii) \text{ Total number of questions} = \text{Correct answer} + \text{Incorrect answer} \\ = x + y = 10 + 10 = 20$$

Question 133:

In a true-false test containing 50 questions, a student is to be awarded 2 marks for every correct answer and -2 for every incorrect answer and 0 for not supplying any answer. If Yash scored 94 marks in a test, what are the possibilities of his marking correct or wrong answer?

Solution:

Since, Yash scored 94 marks.

$$\text{So, minimum correct answer} = \frac{\text{Total marks}}{\text{Marks for 1 correct answer}} = \frac{94}{2} = 47$$

Hence, there are two possibilities:

- (i) 47 correct answers and 3 unattempted.
 (ii) 48 correct answers, 1 unattempted and 1 wrong answer.

Question 134:

A multistory building has 25 floors above the ground level each of height 5 m. It also has 3 floors in the basement each of height 5m. A lift in building moves at a rate of 1m/s. If a man starts from 50m above the ground, how long will it take him to reach at 2nd floor of basement?

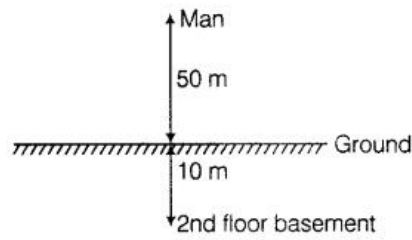
Solution:

Man covers the distance above the ground = 50 m

and man covers the distance below the ground = $2 \times 5 = 10$ m

[∴ distance between two floors = 5 m]

Thus, total distance = 50 m + 10 m = 60 m



∴ Speed of the lift = 1 m/s

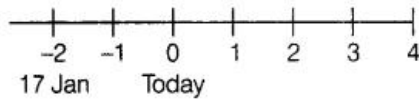
[given]

Hence, time taken to reach second floor of basement = $\frac{\text{Distance}}{\text{Speed}} = \frac{60 \text{ m}}{1 \text{ m/s}} = 60 \text{ s or } 1 \text{ min}$

Question 135:

Taking today as zero on the number line, if the day before yesterday is 17 January, what is the date 3 days after tomorrow?

Solution:



If we take today as zero, then two days before today is 17 January. Hence, 3 days after tomorrow will be at 4th place from zero on the number line.

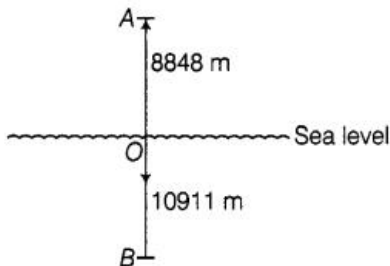
So, required date will be (17+6) January = 23 January

Question 136:

The highest point measured above sea level is the summit of Mt. Everest, which is 8848 m above sea level and the lowest point is challenger deep at the bottom of Mariana Trench which is 10911 m below sea level. What is the vertical distance between these two points?

Solution:

As per the given information, we can draw the diagram,



Let A be the point above the sea level and B be the point below the sea level.

∴ Vertical distance between points A and B = Distance between point A and sea level
+ Distance between point B and sea level
= AO + OB = 8848 + 10911 = 19759 m