Chapter 1

Number System

Exercise 1.1

Question 1.

Fill in the blanks:

(i) $(-30) + _ = 60$ (ii) $(-5) + _ = -100$ (iii) $(-52) + (-52) = _$ (iv) $_ + (-22) = 0$ (v) $_ + (-70) = 70$ (vi) $20 + 80 + _ = 0$ (vii) $75 + (-25) = _$ (viii) $171 + _ = 0$ (ix) $[(-3) + (-12)] + (-77) = _ + [(12) + (-77)]$ (x) $(-42) + [_ + (-23)] = [_ + 15] + _$

Solution:

(i) 90
(ii) -95
(iii) -104
(iv) 22
(v) 140
(vi) -100
(vii) 50
(viii) -171
(ix) -3
(x) +15; -42; -23

Question 2.

Say True or False.

(i) The additive inverse of (-32) is -32
(ii) (-90) + (-30) = 60
(iii) (-125) + 25 = -100

Solution:

(i) False (ii) False (iii) True

Question 3.

Add the following.

(i) 8 and-12 using number line.

Solution:

Starting at zero on the number line facing positive direction and move 8 steps forward reaching 8.



Then we move 12 steps backward to represent -12 – and reach at -4. $\therefore 8 + (-12) = -4$

(ii) (-3) and (-5) using number line.

Solution:

Starting at zero on the number line facing positive direction and move 3 steps backward reaching-3.



Then we move 5 steps backward to represent -5 and reach -8. \therefore (-3) + (-5) = -8

(iii) (-100) + (-10)

Solution:

(-100) + (-10) = -100 - 10 = -110

(iv) 20 + (-72) Solution: 20 + (-72) = 20 - 72 = -52

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(v) 82 + (-75)
Solution:
82 + (-75) = 82 - 75 = 7
(vi) -48 + (-15)
Solution:
-48 + (-15) = -48 - 15 = -63
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(vii) -225 + (-63)
Solution:
-225 + (-63) = -225 - 63 = -288
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Question 4.

Thenmalar appeared for competitive exam which has negative scoring of 1 mark for each incorrect answers. In paper I she answered 25 question incorrectly and in paper II13 questions incorrectly. Find the total reduction of marks.

Solution:

For each incorrect question the score = -1 In paper I, score for 25 incorrect questions – $25 \times (-1) = -25$ In paper II, for 13 incorrect question the score = $13 \times (-1) = -13$ The total marks get reduced = (-25) + (-13) = -38-38 marks will be reduced.

Question 5.

In a quiz competition, Team A scored +30, -20, 0 and team B scored -20, 0,+30 in three successive rounds. Which team will win? Can we say that we can add integers in any order?

Solution:

Total score of team A = [(+30) + (-20)] + 0 = (+10) + 0 = 10Total score of team B = [(-20) + 0] + (+30)= -20 + 30 = +10Score of team A = Score of team B. Yes, we say that we can add integers in any order.

Question 6.

Are (11 + 7) + 10 and 11 + (7 + 10) equal? Mention the property. Solution: First we take (11 + 7) + 10 = 18 + 10 = 28Now 11 + (7 + 10) = 11 + 17 = 28In both the cases the sum is $28 \therefore (11 + 7) + 10 = 11 + (7 + 10)$ This property is known as associative property of integers under addition. Question 7. Find 5 pairs of integers that added to 2.

Solution: 0 + 2 = 2 1 + 1 = 2 -1 + 3 = 2 -2 + 4 = 2-3 + 5 = 2 (and many more.)

Objective Type Questions

Question 8.

The temperature at 12 noon at a certain place was 18° above zero. If it decreases at the rate of 3° per hour at what time if would be 12° below zero? (i) 12 mid night (ii) 12 noon (iii) 10 am (iv) 10 pm

Solution:

(iv) 10 pm : 'Temperature at 12 noon = 18° above zero = $+18^{\circ}$ Rate of decrease per hour = -3° Temperature 12° below zero = -12° -12 is 30 units to the left of $+18^{\circ}$ Time at which it reach $-12^{\circ} = 303 = 10$ h 10 hrs after 12 noon = 10 pm

Question 9.

Identify the problem with negative numbers as its answer. (i) -9 + (-5) + 6(ii) 8 + (-12) - 6(iii) -4 + 2 + 10(iv) 10 + (-4) + 8

Solution:

(i) -9 + (-5) + 6(i) -9 + (-5) + 6 = -14 + 6 = -8(ii) 8 + (-12) + 6 = -4 + 6 = -2(iii) -4 + 2 + 10 = -2 + 10 = 8(iv) 10 + (-4) + 8 = 6 + 8 = 14 Question 10. (-10) + (+7) = ____ (i) +3 (ii) -3 (iii) -17 (iv) +17 Solution: (ii) -3 Question 11. (-8) + 10 + (-2) = ____ (i) 2 (ii) 8 (iii) **0** (iv) 20 Solution: (iii) 0 Question 12. 20 + (-9) + 9 =____ (i) 20 (ii) 29 (iii) 11 (iv) 38 Solution: (i) 20 Ex 1.2 Question 1. Fill in the blanks (i) $-44 + _ = -88$ (ii) ___ - 75 = -45 (iii) $_ - (+50) = -80$ Solution: (i) -44 (ii) 30 (iii) -30

Question 2. Say True or False. (i) (-675) - (-400) = -1075 (ii) 15 - (-18) is the same as 15 + 18 (iii) (-45) - (-8) = (-8) - (-45)

Solution:

(i) False (ii) True (iii) False

Question 3. Find the value of the following. (i) -3 – (-4) using number line.

Solution:

We start at zero facing positive direction. Move 3 units backward to represent (-3). Then turn towards the negative side and move 4 units backwards. We reach+1.



 \therefore (-3) - (-4) = +1

(ii) 7 – (-10) using number line

Solution:



We start at zero facing positive direction. Move 7 units forward to represent (+7). Then turn towards the negative side and move 10 units backwards. We reach +17 \therefore 1 - (-10) = +17

(iii) 35 - (-64)

Solution:

35 - (-64) = 35 + (Additive inverse of -64) = 35 + (+64) = 99 $\therefore 35 - (-64) = 99$ (iv) -200 - (+100)

Solution:

-200 - (+100) = -200 + (Additive inverse of +100) = -200 + (-100) = -300-200 - (+100) = -300

Question 4.

Kabilan was having 10 pencils with him. He gave 2 pencils to senthil and 3 to Karthick. Next day his father gave him 6 more pencils, from that he gave 8 to his sister. How many pencils are left with him?

Solution:

Total pencils Kabilan had = 10 No. of pencils given to Senthil = 2 No. of pencils given to Karthick = 3. Now number of pencils left with Kabilan = 10 - 2 - 3 = 8 - 3 = 5Number of pencils got from his father = 6 No. total pencils Kabilan had = 5 + 6 = 11Number of pencils given to his sister = 8 Number of pencils left with Kabilan = 11 - 8 = 3

Question 5.

A lift is on the ground floor. If it goes 5 floors down and then moves up to 10 floors from there, then in which floor will the lift be?

Solution:

Initially the lift will be in the ground floor representing '0' It goes to 5 floors down \Rightarrow -5 Then it moves 10 floors up +10. Now the lift will be = 0 - 5 + 10 = -5 + 10 = 5th floor (above the ground floor)

Question 6.

When Kala woke up, her body temperature was 102°F. She took medicine for fever. After 2 hours it was 2°F lower. What was her temperature then?

Solution: Kala's temperature initially = $102^{\circ}F$ After two hours the temperature decreased = $-2^{\circ}F$ Now the final temperature = $102^{\circ}F - 2^{\circ}F = 100^{\circ}F$

Question 7. What number should be added to (-17) to get -19?

Solution:

According to the problem = -17 + A number = -19The number = -19 + 17 = -2 \therefore -2 should be added to -17 to get -19

Question 8.

A student was asked to subtract (-12) from -47. He got -30. Is he correct? Justify.

Solution:

Subtracting -12 from -47, we get -47 - (-12) = -47 + (Additive inverse of -12)= -47 + (+12) = -35But the students answer is -30. So he is not correct.

Question 9.

(-5) - (-18) (i) 23 (ii) -13 (iii) 13 (iv) -23

Solution:

(iii) 131

Question 10.

(-100) - 0 + 100 =(i) 200 (ii) 0 (iii) 100 (iv)-200

Solution:

(ii) 0

Ex 1.3

Question 1.

Fill in the blanks.

(i) $-80 \times _ = -80$ (ii) $(-10) \times _ = 20$ (iii) $100 \times _ = -500$ (iv) $__ \times (-9) = -45$ (v) $_ \times 75 = 0$

Solution:

(i) 1 (ii) -2 (iii) -5 (iv) 5 (v) 0

Question 2.

Say True or False: (i) $(-15) \times 5 = 75$ (ii) $(-100) \times 0 \times 20 = 0$ (iii) $8 \times (-4) = 32$

Solution:

(i) False(ii) True(iii) False

Question 3. What will be the sign of the product of the following:

(i) 16 times of negative integers.

(ii) 29 times of negative integers.

Solution:

(i) 16 is an even interger.

If negative integers are multiplied even number of times, the product is a positive integer.

 \div 16 times a negative integer is a positive integer.

(ii) 29 times negative integer.

If negative integers are multiplied odd number of times, the product is a negative integer. 29 is odd.

 \div 29 times negative integers is a negative integer.

Question 4.

Find the product of

(i) $(-35) \times 22$ (ii) $(-10) \times 12 \times (-9)$ (iii) $(-9) \times (-8) \times (-7) \times (-6)$ (iv) $(-25) \times 0 \times 45 \times 90$ $(v) (-2) \times (+50) \times (-25) \times 4$

Solution:

(i) $35 \times 22 = -770$ (ii) $(-10) \times 12 \times (-9) = (-120) \times (-9) = +1080$ (iii) $(-9) \times (-8) \times (-7) \times (-6) = (+72) \times (-7) \times (-6) = (-504) \times (-6) = +3024$ (iv) $(-25) \times 0 \times 45 \times 90 = 0 \times 45 \times 90 = 0 \times 90 = 0$ (v) $(-2) \times (+50) \times (-25) \times 4 = (-100) \times -25 \times 4 = 2500 \times 4 = 10,000$

Question 5.

Check the following for equality and if they are equal, mention the property. (i) $(8 - 13) \times 7$ and $8 - (13 \times 7)$

Solution:

Consider $(8 - 13) \times 7 = (-5) \times 7 = -35$ Now $8 - (13 \times 7) = 8 - 91 = -83$ $\therefore (8 - 13) \times 7 \neq 8 - (13 \times 7)$

(ii) $[(-6) - (+8)] \times (-4)$ and $(-6) - [8 \times (-4)]$

Solution:

 $[(-6) - (+8)] \times (-4) = [(-6) + (-8)] \times (-4) = (-14) \times (-4) = +56$ Now (-6) - [8 × (-4)] = (-6) - (-32) = (-6) + (+32) = +26 \therefore [(-6) - (+8)] × (-4) \neq (-6) - [8 × (-4)]

(iii) $3 \times [(-4) + (-10)]$ and $[3 \times (-4) + 3 \times (-10)]$

Solution: Consider $3 \times [(-4) + (-10)] = 3 \times -14 = -42$ Now $[3 \times (-4) + 3 \times (-10)] = (-12) + (-30) = -42$ Here $3 \times [(-4) + (-10)] = [3 \times (-4) + 3 \times (-10)]$ It is the distributive property of multiplication over addition.

Question 6.

During summer, the level of the water in a pond decreases by 2 inches every week due to evaporation. What is the change in the level of the water over a period of 6 weeks?

Solution:

Level of water decreases a week = 2 inches. Level of water decreases in 6 weeks = $6 \times 2 = 12$ inches

Question 7. Find all possible pairs of integers that give a product of -50.

Solution:

Factor of 50 are 1, 2, 5, 10, 25, 50. Possible pairs of integers that gives product -50: (-1 × 50), (1 × (-50)), (-2 × 25), (2 × (-25)), (-5 × 10), (5 × (-10))

Question 8.

Which of the following expressions is equal to -30.

(i) $-20 - (-5 \times 2)$ (ii) $(6 \times 10) - (6 \times 5)$ (iii) $(2 \times 5) + (4 \times 5)$ (iv) $(-6) \times (+5)$

Solution:

(iv) (-6) × (+5) Hint: (i) -20 + (10) = -10(ii) 60 - 30 = 30(iii) 10 + 20 = 30(iv) (-6) × (+5) = -30

Question 9.

Which property is illustrated by the equation: $(5 \times 2) + (5 \times 5) = 5 \times (2 + 5)$ (i) commutative (ii) closure (iii) distributive (iv) associative

Solution:

(iii) distributive

Question 10.

 $11 \times (-1) = _____(i) -1$ (ii) 0
(iii) +1
(iv) -11

Solution:

(iv) -11

Question 11.

 $(-12) \times (-9) =$ (i) 108 (ii) -108 (iii) +1 (iv) -1

Solution:

(i) 108

Ex 1.4

Question 1.

Fill in the blanks.

(i) $(-40) \div _ =40$ (ii) $25 \div _ = -5$ (iii) $_ \div (-4) = 9$ (iv) $(-62) \div (-62) = _$

Solution:

(i) -1 (ii) -5 (iii) -36 (iv) 1

Question 2. Say True or False:

(i) $(-30) \div (-6) = -6$ (ii) $(-64) \div (-64)$ is 0 Solution: (i) False (ii) False

Question 3.

Find the values of the following. (i) $(-75) \div 5$ (ii) $(-100) \div (-20)$ (iii) $45 \div (-9)$ (iv) $(-82) \div 82$

Solution:

(i) -755 = -15

(ii) -100-20 = 5(iii) 45-9 = -5(iv) -8282 = -1

Question 4.

The product of two integers is -135. If one number is -15. Find the other integer.

Solution:

Given the product of two integers = -135 One of them = -15 \therefore -15 × Another number = -135 Other number = -135-15 = 9 \therefore The other number = 9.

Question 5.

In 8 hours duration, with uniform decrease in temperature, the temperature dropped 24°C. How many degrees did the temperature drop each hour?

Solution:

In 8 hours the drop in temperature = 24In 1 hour the drop in temperature = $248 = 3^{\circ}$ The temperature dropped 3°C every hour.

Question 6.

An elevator descends into a mine shaft at the rate of 5 m/min. If the descent starts from 15 m above the ground level, how long will it take to reach -250 m?

Solution:

The elevator's position = 15 m above ground level = +15 m It should reach = -250 m The distance to be travelled = 15 - (-250) m = 15 + (+250) m 265 m Time taken to descend 5 m = 1 min \therefore Time required to descend 265 m = 248 = 53 min

Question 7.

A person lost 4800 calories in 30 days. If the calory loss is uniform, calculate the loss of calory per day.

Solution:

Loss of calory in 30 days = 4800 \therefore Loss of calory in 1 day = 480030 = 160 calories \therefore 160 calories lost per day. Question 8. Given $168 \times 32 = 5376$ then fined (-5376) ÷ (-32).

Solution: Given 168 × 32 = 5376 ∴ 537632 = 168 Also, -5376-32 = 168

Question 9. How many -4's are there is (-20)?

Solution: Number of -4's in (-20) = -20-4 = 5

Question 10. (-400) divided into 10 equal parts gives _____

Solution: -40010 = -4

Question 11.

Which of the following does not represent an integer? (i) $0 \div (-7)$ (ii) $20 \div (-4)$ (iii) $(-9) \div 3$ (iv) $12 \div 5$

Solution:

(iv) 12 ÷ 5

Question 12. (-16) ÷ 4 is the same as (i) -(-16 ÷ -4) (ii) -(16) ÷ (-4) (iii) 16 ÷ (-4) (iv) -4 ÷ -16

Solution:

(iii) 16 ÷ (-4)

Question 13.

(-200) ÷ 10 is (i) 20 (ii) -20 (iii) -190 (iv) 210

Solution:

(ii) 20

Question 14. The set of integers is not closed under

(i) Addition(ii) Subtraction(iii) Multiplication(iv) DivisionSolution:(iv) Division

Ex 1.5

Question 1. One night in Kashmir, the temperature is -5°C. Next day the temperature is 9°C. What is the increase in temperature?

Solution:

Temperature in the first day = -5° C Temperature in the next day = 9° C \therefore Increase in temperature = 9° C - (-5° C) = 9° C + ($+5^{\circ}$ C) = 14° C

Question 2.

An atom can contain protons which have a positive charge (+) and electrons which have a negative charge (-). When an electron and a proton pair up, they become neutral (0) and cancel the charge at. Now determine the net charge: (i) 5 electrons and 3 protons \rightarrow -5 + 3 = -2 that is 2 electrons $\ominus \ominus$

(ii) 6 protons and 6 electrons \rightarrow

(iii) 9 protons and 12 electrons \rightarrow

(iv) 4 protons and 8 electrons \rightarrow

(v) 7 protons and 6 electrons \rightarrow

Solution:

(ii) 6 protons and 6 electrons \rightarrow (+6) + (-6) = 0 (iii) 9 protons and 12 electrons \rightarrow (+9) + (-12) = 9-12 = -3 \Rightarrow 3 electrons $\ominus \ominus \ominus$ (iv) 4 protons and 8 electrons \rightarrow (+4) + (-8) = +4 - 8 = -4 \Rightarrow 4 electrons $\ominus \ominus \ominus \ominus$ (v) 7 protons and 6 electrons \rightarrow (+7) + (-6) = +1 = 1 proton \oplus

Question 3.

Scientists use the Kelvin scale (K) as an alternative temperature scale to degrees Celsius (°C) by the relation $T^{\circ}C = (T + 273)K$. Convert the following to Kelvin:

(i) -275°C (ii) 45°C (iii) -400°C (iv) -273°C

Solution:

(i) $-275^{\circ}C = (-275 + 273)K = -2K$ (ii) $45^{\circ}C = (45 + 273)K = 318 K$ (iii) $-400^{\circ}C = (-400 + 273)K = -127 K$ (iv) $-273^{\circ}C = (-273 + 273) K = 0K$

Question 4.

Find the amount that is left in the student's bank account, if he has made the following transaction in a month. His initial balance is \gtrless 690.

(i) Deposit (+) of ₹ 485

(ii) Withdrawal (-) of ₹ 500

(iii) Withdrawal (-) of ₹ 350

(iv) Deposit (+) of ₹ 89

(v) If another 300 was withdrawn, what would the balance be?

Solution:

(i) Initial balance of student's account = ₹ 690
Deposited amount = ₹ 485 (+)
∴ Amount left in the account = ₹ 690 + ₹ 485 = ₹ 1175

(ii) Balance in the account = ₹ 1175
Amount withdrawn = ₹ 500 (-)
Amount left = ₹ 1175 - ₹ 500 = ₹ 675

(iii) Balance in the account = ₹ 675
Amount withdrawn = ₹ 350 (-)
Amount left = ₹ 675 - ₹ 350 = ₹ 325

(iv) Balance in the account = ₹ 325
Amount deposited = ₹ 89(+)
Amount left = ₹ 325 + ₹ 89 = ₹ 414

(v) Balance in the account = ₹ 414
Amount withdrawn = ₹ 300 (-)
Amount left = ₹ 414 - ₹ 300 = ₹ 114

Question 5.

A poet Tamizh Nambi lost 35 pages of his 'lyrics' when his file had got wet in the rain. Use integers, to determine the following.

(i) If Tamil Nambi wrote 5 pages per day, how many day's work did he lose?(ii) If four pages contained 1800 characters, (letters) how many characters were lost?

(iii) If Tamil Nambi is paid \gtrless 250 for each page produced, how much money did he lose?

(iv) If Kavimaan helps Tamizh Nambi and they are able to produce 7 pages per day, how many days will it take to recreate the work lost?

(v) Tamizh Nambi pays Kavimann ₹ 100 per page for his help. How much money does Kavimaan receive?

Solution:

Total pages lost – 35 One day work = 5 page 35 35 pages = 355 = 7 days work

 \therefore 7 day's work he lost.

(ii) Number of characters in four pages = 1800Number of characters in one page = 18004 = 450 \therefore Number of characters in 35 pages = $450 \times 35 = 15,750$ characters

(iii) Payment for one page = ₹ 250
∴ Payment for 35 pages = ₹ 250 × ₹ 35 = ₹ 8,750

(iv) Number of pages recreated a day = 7
∴ To recreate 35 pages day's needed = 357 = 5 days

(v) Payment of Kavimaan = ₹ 100 per page
∴ for 35 pages payment = ₹ 100 × 35 = ₹ 3,500

Question 6. Add 2 to me. Then multiply by 5 and subtract 10 and divide new by 4 and I will give you 15! Who am I?

Solution: According to the problem $\{[(I + 2) \times 5] - 10\} \div 4 = 15$ $\{[(I + 2) \times 5] - 10\} = 15 \times 4 = 60$ I + 2 = 705 = 14 $(I + 2) \times 5 = 60 + 10 = 70$ I = 14 - 2; I = 12

Question 7.

Kamatchi, a fruit vendor sells 30 apples and 50 pomegranates. If she makes a profit of ? 8 per apple and loss ? 5 per pomegranate. What will be her overall profit or loss?

Solution:

Number of apples Kamatchi sold = 30 Profit per apple = $\gtrless 8(+)$ \therefore Profit for 30 apples = $30 \times 8 = \gtrless 240$ Number of pomegranates sold 50 Loss per pomegranate = $\gtrless 5(-)$ Loss on selling 50 pomegranates = $50 \times (-5) = \end{Bmatrix} -250$ Overall loss = $-250 + 240 = \end{Bmatrix} -10$ i.e. loss $\gtrless 10$.

Question 8.

During a drought, the water level in a dam fell 3 inches per week for 6 consecutive weeks. What was the change in the water level in the dam at the end of this period?

Solution:

Water level fall per week = -3 inches

∴ Water level decrease for 6 weeks = 6 ₹ (-3) = 18 inches

∴ decrease of 18 inches of water level.

Question 9.

Buddha was born in 563 BC (BCE) and died in 483 BC (BCE). Was he alive in 500 BC (BCE)? and find his life time. (Source: Compton's Encyclopedia)

Solution:

Years in BCC (BCE) are taken as negative integers.

Buddha was bom in -563 and died in -483 So he was alive in 500 BC (BCE) Life time = -483 - (-563) = -483 + 563 = +80Buddha's life time = 80 years. Ex 1.6

Miscellaneous Practice Problems

Question 1. What should be added to -1 to get 10?

Solution:

(-1) + a number = 10 ∴ The number = 10 + 1 = 11

Question 2. -70 + 20 = -10

Solution:

LHS =
$$-70 + 20 = -50$$

RHS = $-10 \Rightarrow = -50 + 10 = -40$
 $-70 + 20 = -40 - 10$

Question 3. Substract 94860 from (-86945)

Solution: -86945 - (94860) = -86945 + (Additive inverse of 94860) = -86945 + (-94860) = -1,81,805

Question 4. Find the value of (-25) + 60 + (-95) + (-385)

Solution: (-25) + 60 + (-95) + (-385) = 35 + (-95) + (-385) = -60 + (-385) = -445

Question 5. Find the sum of (-9999) (-2001) and (-5999).

Solution: (-9999) + (-2001) + (-5999) = -12,000 + (-5999) = -17,999

Question 6. Find the product of (-30) × (-70) × 15. $(-30) \times (-70) \times 15 = (+2100) \times 15 = 31,500$ Question 7. Divide-72 by 8.

Solution: -728 = -9

Question 8.

Find two pairs of integers whose product is +15.

Solution:

(i) $(+3) \times (+5)$ (ii) $(-3) \times (-5)$

Question 9. Check the following for equality. (i) (11 + 7) + 10 and 11 + (7 + 10)(ii) $(8 - 13) \times 7$ and $8 - (13 \times 7)$ (iii) $[(-6) - (+8)] \times (-4)$ and $(-6) - [8 \times (-4)]$ (iv) $3 \times [(-4) + (-10)]$ and $[3 \times (-4) + 3 \times (-10)]$

Solution: (i) LHS = (11 + 7) + 10 = 18 + 10 = 28RHS = 11 + (7 + 10)= 11 + (17) = 28LHS = RHS $\therefore (11 + 7) + 10 = 11 + (7 + 10)$

(ii) LHS = $(8 - 13) \times 7 = -5 \times 7 = -35$ RHS = $8 - (13 \times 7) = 8 - 91 = -83$ LHS \neq RHS $\therefore (8 - 13) \times 7 \neq 8 - (13 \times 7)$

(iii) LHS = $[(-6) - (+8)] \times (-4) = [(-6) + (-8)] \times (-4) = (-14) \times (-4) = +56$ RHS = $(-6) - [8 \times (-4)] = -6 - (-32)$ = -6 + (+32) = +26LHS \neq RHS $\therefore [(-6) - (+8)] \times (-4) \neq (-6) - [8 \times (-4)]$

(iv) LHS = $3 \times [(-4) + (-10)] = 3 \times (-14) = -42$ RHS = $[3 \times (-4) + 3 \times (-10)] = (-12) + (-30) = -42$ LHS = RHS $3 \times [(-4) + (-10)] = [3 \times (-4) + 3 \times (-10)]$

Question 10.

Kalaivani had ₹ 5000 in her bank account on 01.01.2018. She deposited ₹ 2000 in January and withdrew ₹ 700 in February. What was Kalaivani's bank balance on 01.04.2018, if she deposited ₹ 1000 and withdraw ₹ 500 in March.

Solution:

Initial bank balance = $\underbrace{\$} 5000$; Total deposits: January : $\underbrace{\$} 2000$; March : $\underbrace{\$} 1000$ Total deposits upto March = $\underbrace{\$} 5000 + \underbrace{\$} 2000 + \underbrace{\$} 1000 = \underbrace{\$} 8000$ Amount withdrawn: February : $\underbrace{\$} 700$ (-) March : $\underbrace{\$} 500$ (-) \therefore Total amount withdrawn = (-700) + (-500) \underbrace{\\$} -1200 Net bank balance = $\underbrace{\$} 8000 - \underbrace{\$} 1200 = \underbrace{\$} 6800$

Question 11.

The price of an item x increases by $\gtrless 10$ every year and an item y decreases by $\gtrless 15$ every year. If in 2018, the price of x is $\gtrless 50$ andy is $\gtrless 90$, then which item will be costlier in the year 2020?

Solution:

Amount increases for x every year = $\gtrless 10$. Price of x in 2018 = $\gtrless 50$; Price of x in 2019 = $\gtrless 50 + \gtrless 10 = \end{Bmatrix} 60$ Price of x in 2020 = $\gtrless 60 + \gtrless 10 = \end{Bmatrix} 70$ Amount decreases for y per year = $\gtrless 15$ Price of y in 2018 = $\gtrless 90$ Price of y in 2019 = $\gtrless 90 - \end{Bmatrix} 15 = \end{Bmatrix} 75$ Price of y in 2020 = $\gtrless 75 - \end{Bmatrix} 15 = \end{Bmatrix} 60$ Here 70 > 60. Item x will costlier in year 2020.

Question 12.

Match the statements in Column A and Column B.

S.No.	А	В			
1.	For any two integers 72 and 108, 72+108 is an also an integer.	(a) Distributive property of multiplication over addition.			
2.	For any three integers 68, 25 and 99 $68 \times (25 + 99) = (68 \times 25) + (68 \times 99)$	(b) Multiplicative identity.			
3.	0 + (-138) = (-138) = (-138)+0	(c) Commutative property under multiplication.			
4.	For any two integers (-5) and 10 $(-5) \times 10 = 10 \times (-5)$	(d) Closed under addition.			
5.	$1 \times (-1098) = (-1098) = (-1098) \times 1$	(e) Additive identity.			

Solution:

1. – d 2. – a 3. – e 4. – c 5. – b

Challenge Problems

Question 13.

Say True or False.

(i) The sum of a positive integer and a negative integer is always a positive integer.

(ii) The sum of two integers can never be zero

(iii) The product of two negative integers is a positive integer.

(iv) The quotient of two integers having opposite sign is a negative integer.

(v) The smallest negative integer is -1.

Solution:

(i) False

(ii) False

- (iii) True
- (iv) True
- (v) False

Question 14.

An integer divided by 7 gives a result -3. What is that integer?

Solution:

According to the problem An integer 7 = -3 \therefore The integer $= -3 \times 7$ The required integer = -21.

Question 15.

Replace the question mark with suitable integer in the equation.

72 + (-5) - ? = 72

Solution:

$$72 + (-5) - ? = 72$$

$$67 - ? = 72$$

$$-? = 72 - 67 = 5$$

$$? = -5$$

$$72 + (-5) - 5 = 72$$

...

Question 16. Can you give 10 pairs of single digit integers whose sum is zero?

Solution: 1 + (-1) + 2 + (-2) + 3 + (-3) + 4 + (-4) + 5 + (-5) = 0

Question 17. If P = -15 and Q = 5 find (P - Q) - (P + Q).

Solution: Given P = 15; Q = 5 $(P-Q) \div (P+Q) = \frac{(-15)-5}{(-15)+5} = \frac{(-15)+(-5)}{-10} = \frac{-20}{-10} = 2$

Question 18.

If the letters in the English alphabets A to M represent the number from 1 to 13 respectively and N represents 0 and the letters 0 to Z correspond from -1 to -12, find the sum of integers for the names given below. For example, MATH \rightarrow Sum \rightarrow 13 + 1 - 6 + 8 = 16 (i) YOUR NAME (ii) SUCCESS

Solution:

Given

А	В	С	D	Е	F	G	Н	Ι	J	K	L	Μ
1	2	3	4	5	6	7	8	9	10	11	12	13
N	0	Р	Q	R	S	Т	U	V	W	X	Y	Z
0	$^{-1}$	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12
(i) M (ii) S = -12 = -11	y nam UCCE: 2 + 6 -	te LEE SS → (+ + 5 + (NA → -5) + (-10) =	12 + 5 (-7) + 3 = -6 +	+ 5 + 3 + 3 5 + (-	- 0 + 1 + 5 + ·10) =	= 23 (-5) + (-1) +	- (-5) - (-10)				

Question 19.

From a water tank 100 litres of water is used every day. After 10 days there is 2000 litres of water in the tank. How much water was there in the tank before 10 days?

Solution:

Water used for one day = 100 litres. Water used for 10 days = $100 \times 10 = 1000$ litres. After 10 days water left in the tank = 2000 litres Initially amount of water will be = 2000 + 1000 = 3000 litres

Question 20.

A dog is climbing down into a well to drink water. In each jump it goes down 4 steps. The water level is in 20th step. How many jumps does the dog take to reach the water level?

Solution:

The water in the well is at 20th step. For each jump the dog goes low 4 steps. 5 \therefore Number of jumps the dog to reach the water = 204 = 5 jumps

Question 21.

Kannan has a fruit shop. He sells 1 dozen banana at a loss of ? 2 each because it may get rotten next day. What is his loss?

Solution: 1 dozen = 12 bananas

For 1 banana loss = $\gtrless 2$ For 12 bananas loss = $\gtrless 2 \times 12 = \gtrless 24$

Question 22. A submarine was situated at 650 feet below the sea level. If it descends 200 feet, what is its new position?

Solution:

Position of submarine = 650 feet below sea level = -650 feet Again the depth it descends = 200 feet below = -200 feet \therefore Position of submarine = (-650) + (-200) = -850 feet The submarine will be 850 feet below the sea level.

Question 23.

In a magic square given below each row, column and diagonal should have the same sum. Find the values of x, y, and z.

1	-10	x			
y	-3	-2			
-6	4	Z			

Solution:

Column total = Row total = diagonal total $\therefore 1 + y + (-6) = (-10) + (-3) + 4$ y + (-5) = -13 + 4

$$y = -9 + 5$$

$$y = -4$$

So 1 + (-10) + x = y + (-3) + (-2)

$$-9 + x = (-4) + (-3) + (-2)$$

$$-9 + x = -9$$

x = -9 + 9
x = 0
Now x + (-2) + z = (-10) + (-3) + 4
0 + (-2) + z = (-13) + 4

$$-2 + z = -9$$

z = -9 + 2 = -7
z = -7

$$\therefore x = 0, y = -4, z = -7$$