

Loyola



EC MATHEMATICS

7

TERM - I
TERM - II
TERM - III

**This special guide is prepared on
the basis of New Syllabus and
Govt. Key**

Loyola

Publications

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----- Preface -----

1. விடைகள் மிக எளிமையாகவும், மாணவ மாணவிகள் எளிதில் புரியும் வண்ணம் 10, 11 மற்றும் 12-ம் வகுப்பு அரசுத் தேர்வில் விடைத்தாள் மதிப்பீடு செய்வது போல அதன் [Key] அடிப்படையில் தயாரிக்கப்பட்டுள்ளது.
2. 2 மற்றும் 5 மதிப்பெண் விடைகள் சற்று விரிவாக கொடுக்கப்பட்டுள்ளது.
3. தேவைக்கேற்ப கூடுதல் வினாக்கள் கொடுக்கப்பட்டுள்ளது.
4. 6ம் வகுப்பு முதல் 9ம் வகுப்பு வரை அனைத்து நூல்களும் அரசுத்தேர்வை நோக்கியே எழுதப்பட்டுள்ளது.

குறிப்பு: Loyola EC புத்தகங்களை 10,11 மற்றும் 12-ம் வகுப்பு மாணவ மாணவிகள் வாங்கிப் பயின்றால், அரசுத் தேர்வில் அதிக மதிப்பெண் பெற்று உச்சத்தை தொடலாம் என்பதை மகிழ்ச்சியுடன் தெரிவித்துக் கொள்கிறோம்.

வாழ்த்துக்கள்

அன்புடன்

Loyola Publication

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Chapter 1

NUMBER SYSTEM

TERM - I

Addition of Integers

SUMMARY

- Use of the properties of four fundamental operations applied to integers.
- Use of solving problems by Operators.
- Use number line for adding integers.

Exercise : 1.1

1. Fill in the Blanks:

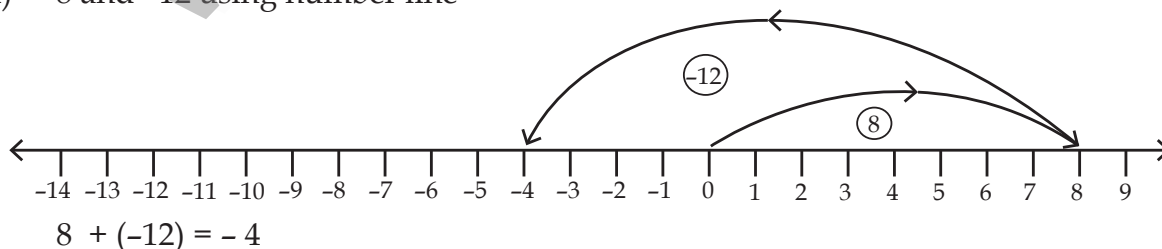
- | | |
|--|--------------------|
| i) $(-30) + \underline{\hspace{2cm}} = 60$ | Ans : 90 |
| ii) $(-5) + \underline{\hspace{2cm}} = -100$ | Ans : -95 |
| iii) $(-52) + (-52) = \underline{\hspace{2cm}}$ | Ans : -104 |
| iv) $\underline{\hspace{2cm}} + (-22) = 0$ | Ans : 22 |
| v) $\underline{\hspace{2cm}} + (-70) = 70$ | Ans : 140 |
| vi) $20 + 80 + \underline{\hspace{2cm}} = 0$ | Ans : -100 |
| vii) $75 + (-25) = \underline{\hspace{2cm}}$ | Ans : 50 |
| viii) $171 + \underline{\hspace{2cm}} = 0$ | Ans : -171 |
| ix) $[(-3) + (-12)] + (-77) = \underline{\hspace{1cm}} + [(-12) + (-77)]$ | Ans : -3 |
| x) $(-42) + [\underline{\hspace{1cm}} + (-23)] = [\underline{\hspace{1cm}} + 15] + \underline{\hspace{2cm}}$ | Ans : 15, -42, -23 |

2. Say True or False

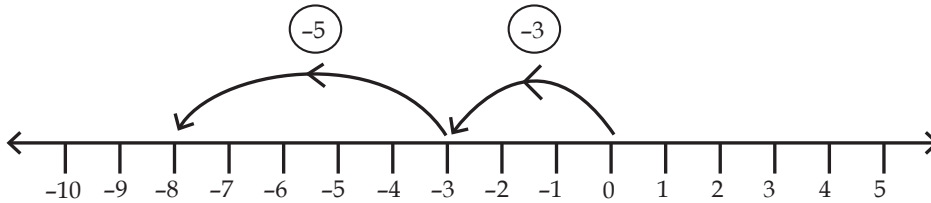
- | | |
|---|-------------|
| i) The additive inverse of (-32) is (-32) | Ans : False |
| ii) $(-90) + (-30) = 60$ | Ans : False |
| iii) $(-125) + 25 = -100$ | Ans : True |

3. Add the Following

- i) 8 and -12 using number line



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



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

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

iv) $20 + (-72) = -52$

v) $82 + (-75) = 7$

vi) $-48 + (-15) = -63$

vii) $-225 + (-63) = -288$

4. Thenmalar appeared for competitive exam which has negative scoring of 1 mark for each incorrect answer. In paper I she answered 25 questions incorrectly and in paper II, 13 questions incorrectly. Find the total reduction of marks.

Solution :

$$\text{Paper I} = -25$$

$$\text{Paper II} = -13$$

$$\text{The total reduction of Marks} = \text{Paper I} + \text{Paper II}$$

$$= (-25) + (-13)$$

$$= -38$$

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 : Team A = $(+30) + (-20) + 0 = 10$

Team B = $(-20) + (0) + (+30) = 10$

Team A = Team B [Yes, it can be added in any order]

6. Are $(11 + 7) + 10$ and $11 + (7 + 10)$ equal? Mention the property.

Solution : Associative property : $(A + B) + C = A + (B + C)$

$$(11 + 7) + 10 = 18 + 10 = 28$$

$$11 + (7 + 10) = 11 + 17 = 28$$

Both are equal. Associative property under addition

7. Find 5 Pairs of integers that add up to 2.

Solution : $0 + 2 = 2$

$$0 + 1 = 2$$

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

$$(-2) + 4 = 2$$

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

$\therefore 0 + 2, 1 + 1 = 2, (-1) + 3, (-2) + 4, (-3) + 5$ (any pair)

Objective Type Questions

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 it would be 12° below zero?

- i) 12 mid night ii) 12 noon iii) 10 am iv) 10 pm

Ans: iii) 10 pm

9. Identify the problem with negative numbers as its answer:

- i) $-9 + (-5) + 6$ ii) $8 + (-12) - 6$
 iii) $-4 + 2 + 10$ iv) $10 + (-4) + 8$

Ans: i) $-9 + (-5) + 6$

10. $(-10) + (+7) =$ _____

- i) +3 ii) -3 iii) -17 iv) +17 Ans: ii) -3

11. $(-8) + 10 + (-2) =$ _____

- i) 2 ii) 8 iii) 0 iv) 20 Ans: iii) 0

12. $20 + (-9) + 9 =$ _____

- i) 20 ii) 29 iii) 11 iv) 38 Ans: i) 20

Subtraction of Integers

SUMMARY

- Let us learn subtraction of integers using number line.
- Every subtraction statement has a corresponding addition statement.

Exercise : 1.2

1. Fill in the blanks.

Answers

- | | |
|----------------------------|------|
| i) $-44 +$ _____ $= -88$ | - 44 |
| ii) _____ $-75 = -45$ | 30 |
| iii) _____ $- (+50) = -80$ | - 30 |

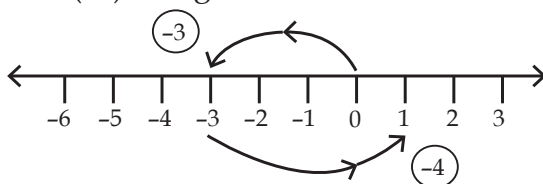
2. Say True or False

Answers

- | | |
|---|-------|
| i) $(-675) - (-400) = -1075$ | False |
| ii) $15 - (-18)$ is the same as $15 + 18$ | True |
| iii) $(-45) - (-8) = (-8) - (-45)$ | False |

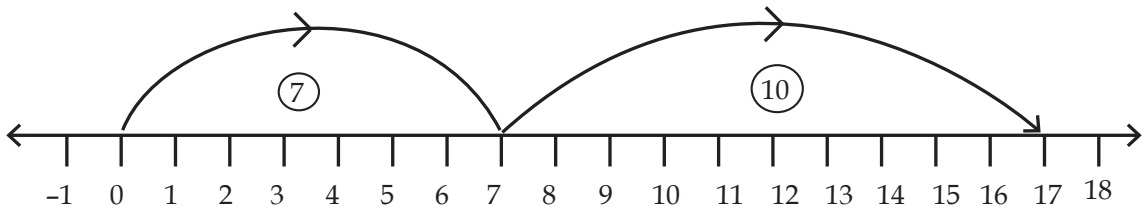
3. Find the value of the following

i) $-3 - (-4)$ using number line



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

ii) $7 - (-10)$ using number line



$$7 - (-10) = 7 + 10 = 17$$

iii) $35 - (-64)$

$$35 - (-64) = 35 + 64 = 99$$

iv) $-200 - (+100) = (-200) + (-100) = -300$

4. Kabilan was having 10 pencils with him. He gave 2 pencils to Senthil and 3 to Karthik. 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 :

$$\begin{aligned} &= 10 + (-2) + (-3) + 6 + (-8) \\ &= 16 + (-13) \\ &= 3 \end{aligned}$$

3 pencils Karthick left with him

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

Solution : 5 floors down = (-5)

10 floors upto = $(+10)$

Floor will be = $(-5) + (+10) = +5$

5th Floor (above the ground floor)

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 the temperature then?

Solution : $102^{\circ}\text{F} - 2^{\circ}\text{F}$

$$= 100^{\circ}\text{F}$$

The temperature was 100°F

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

Solution : Let x be the number.

$$(-17) + x = -19$$

$$x = -19 + 17$$

$$\boxed{x = -2}$$

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

Justify

$$\begin{aligned} \text{Solution : } & (-47) - (-12) \\ & = (-47) + (+12) \\ & = -35 \\ & -35 \neq -30 \\ \therefore & \text{Wrong } (-35 \text{ is correct answer}) \end{aligned}$$

Objective Type Questions

9. $(-5) - (-18) =$

i) 23

ii) -13

iii) 13

iv) -23

Ans: iii) 13

10. $(-100) - 0 + 100 =$

i) 200

ii) 0

iii) 100

iv) -200

Ans: ii) 0

Multiplication of Integers

SUMMARY

- Use the properties of Multiplication of Integers.
- Use the sign product.

Exercise : 1.3

| 1. Fill in the blanks. | Answers |
|--|---------|
| i) $-80 \times \underline{\quad} = -80$ | 1 |
| ii) $(-10) \times \underline{\quad} = 20$ | (-2) |
| iii) $(100) \times \underline{\quad} = -500$ | -5 |
| iv) $\underline{\quad} \times (-9) = -45$ | 5 |
| v) $\underline{\quad} \times 75 = 0$ | 0 |

| 2. Say True or False | Answers |
|-------------------------------------|---------|
| i) $(-15) \times 5 = 75$ | False |
| ii) $(-100) \times 0 \times 20 = 0$ | True |
| iii) $8 \times (-4) = 32$ | False |

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

i) 16 times of negative integer

Ans: positive Integers

ii) 29 times of negative integer

Ans: negative Integers

4. Find the product of

- i) $(-35) \times 22 = -770$.
 ii) $(-10) \times 12 \times (-9) = 1080$.
 iii) $(-9) \times (-8) \times (-7) \times (-6) = 3024$.
 iv) $(-25) \times 0 \times 45 \times 90 = 0$.
 v) $(-2) \times (+50) \times (-25) \times 4 = 1000$.

5. Check the following for equality if they are equal, mention the property

i) $(8-13) \times 7$ and $8 - (13 \times 7)$

Solution : $(8-13) \times 7 = -5 \times 7 = -35$

$8 - (13 \times 7) = 8 - 91 = -83$

$(-35) \neq (-83)$

not equal

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

Solution : $[(-6) - (+8)] \times (-4) = [(-6) + (-8)] \times (-4)$
 $= [(-14) \times (-4)] = 56$

$[-6 - (8 \times (-4))] = (-6) - (-32)$
 $= (-6) + (32) = 26$

$56 \neq 26$

Not equal

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

Solution : $3 \times [(-4) + (-10)] = 3 \times (-14)$
 $= -42$

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

$-42 = -42$ (equal)

Distributive property of multiplication over addition.

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 : Decrease in first week = - 2 inches

Water level in 6th week = -2×6

= -12 inches

Decrease of 12 inches

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

Solution : $1 \times (-50) = -50$

$(-1) \times 50 = -50$

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

$-2 \times 25 = -50$

$5 \times (-10) = -50$

$(-5) \times 10 = -50$

$1 \times (-50), (-1) \times 50, 2 \times (-25), (-2) \times 25, 5 \times (-10), -5 \times 10$

Objective Type Questions

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) $(-6) \times (+5)$

Ans: iv) $(-6) \times (+5)$

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

Ans: iii) distributive

10. $11 \times (-1) = \underline{\hspace{2cm}}$

i) -1

ii) 0

iii) +1

iv) -11

Ans: iv) -11

11. $(-12) \times (-9) = \underline{\hspace{2cm}}$

i) 108

ii) -108

iii) +1

iv) -1

Ans: i) 108

Division of Integers

SUMMARY

- The division of two integers with the same sign is a positive integers.
- The division of two integers with opposite signs gives a negative integers.

Note: An Integer divided by zero is meaningless. But zero divided by a non-zero integer is zero.

Exercise : 1.4

| 1. Fill in the blanks. | Answers |
|---|---------|
| i) $(-40) \div \underline{\hspace{2cm}} = 40$ | -1 |
| ii) $25 \div \underline{\hspace{2cm}} = -5$ | -5 |
| iii) $\underline{\hspace{2cm}} \div (-4) = 9$ | -36 |
| iv) $(-62) \div (-62) = \underline{\hspace{2cm}}$ | 1 |

| 2. Say True or False. | Answers |
|-----------------------------|---------|
| i) $(-30) \div (-6) = -6$ | False |
| ii) $(-64) \div (-64)$ is 0 | False |

3. Find the values of the following.

- | | |
|---|--|
| i) $(-75) \div 5$ $\frac{-75}{5} = -15$ | iii) $45 \div (-9)$ $\frac{45}{-9} = -5$ |
| ii) $(-100) \div (-20)$ $\frac{-100}{-20} = 5$ | ii) $(-82) \div 82$ $\frac{-82}{82} = -1$ |

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

Solution : Let x be the other integer

$$\text{Product of two integer} = -135$$

$$\text{One number} \times \text{other integer} = -135$$

$$(-15) \times x = -135$$

$$x = \frac{-135}{-15} \quad x = 9$$

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 : Let x be the temperature drop each hour

$$\text{Temperature drop} \times \text{time} = \text{Temperature}$$

$$x \times 8 = 24^{\circ}\text{C}$$

$$x = \frac{24^{\circ}\text{C}}{8} = 3^{\circ}\text{C}$$

Dropped 3°C per hour

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

Solution : Speed = $5\text{m} / \text{min}$

$$\text{distance} = 15\text{ m} - (-250\text{ m})$$

$$= 15 + 250$$

$$= 265\text{ m}$$

$$\text{Time} \times \text{Speed} = \text{distance}$$

$$\text{Time} \times 5 = 265$$

$$\text{Time} = \frac{265}{5} = 53 \quad \text{It will take } 53 \text{ min}$$

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

Solution : Calorie loss in 30 days = 4800

$$\text{loss in one day} = \frac{4800}{30}$$

$$= 160$$

160 calories lost per day

8. Given $168 \times 32 = 5376$ then find $(-5376) \div (-32)$

Solution : $168 \times 32 = 5376$

$$\frac{-5376}{-32} = 168 \quad \dots\dots\dots (1)$$

$$\frac{-5376}{-32} = \frac{5376}{32} = 168 \quad \text{by (1)}$$

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

Solution : $(-4) \times x = -20$

$$x = \frac{-20}{-4}$$

$$x = 5$$

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

Solution : $\frac{(-400)}{10} = -40$

Objective Type Questions

11. Which of the following does not represent an Integer?

i) $0 \div (-7)$ ii) $20 \div (-4)$ iii) $(-9) \div 3$ iv) $12 \div 5$

Ans: iv) $12 \div 5$

12. $(-16) \div 4$ is the same as

i) $-(-16 \div 4)$ ii) $-(16) \div (-4)$ iii) $16 \div (-4)$ iv) $-4 \div (16)$

Ans: iii) $16 \div (-4)$

13. $(-200) \div 10$ is

i) 20 ii) -20 iii) -190 iv) 210

Ans: ii) -20

14. The set of integers is not closed under

i) Addition ii) Subtraction iii) Multiplication iv) Division

Ans: iv) Division

Statement Problems on Integers using all Fundamental Operations

Exercise : 1.5

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

Solution : Night temperature = -5°C
 Next day temperature = 9°C
 Increase in temperature = $9^{\circ}\text{C} - (-5^{\circ}\text{C})$
 $= 9^{\circ}\text{C} + 5^{\circ}\text{C}$
 $= 14^{\circ}\text{C}$

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 out. 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 $\Rightarrow (+6) + (-6) = 0$ that is no electrons
 iii) 9 protons and 12 electrons $\Rightarrow (+9) + (-12) = (-3)$ that is 3 electrons $\ominus \ominus \ominus$
 iv) 4 protons and 8 electrons $\Rightarrow (+4) + (-8) = (-4)$ that is 4 electrons $\ominus \ominus \ominus \ominus$
 v) 7 protons and 6 electrons $\Rightarrow (+7) + (-6) = 1$ that is 1 proton \oplus

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

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

Solution :

i) $T^{\circ}\text{C} = (T + 273)$ K
 $= (-275^{\circ} + 273)$ K
 $= -2^{\circ}\text{K}$

ii) $T^{\circ}\text{C} = (T + 273)$ K
 $= (45^{\circ} + 273^{\circ})$ K
 $= 318^{\circ}\text{K}$

iii) $T^{\circ}\text{C} = (T + 273)$ K
 $= (-400^{\circ} + 273)$ K
 $= -127^{\circ}\text{K}$

iv) $T^{\circ}\text{C} = (T + 273)$ K
 $= (-273 + 273)$ K
 $= 0^{\circ}\text{K}$

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 ₹ 690.
- Deposit (+) of ₹ 485
 - Withdrawal (-) of ₹ 500
 - Withdrawal (-) of ₹ 350
 - Deposit (+) of ₹ 89
 - If another ₹ 300 was withdrawn, what would the balance be?

Solution :

- Deposit = ₹ 690 + ₹ 485 = ₹ 1175
- Withdrawal = ₹ 1175 - ₹ 500 = ₹ 675
- Withdrawal = ₹ 675 - ₹ 350 = ₹ 325
- Deposit = ₹ 325 + ₹ 89 = ₹ 414
- Withdrawal = ₹ 414 - ₹ 300 = ₹ 114

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:

- If Tamizh Nambi wrote 5 page per day, how many day's work did he lose?
- If four pages contained 1800 characters, (letters) how many characters were lost?
- If Tamizh Nambi is paid ₹ 250 for each page produced, how much money did he lose?
- 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?
- Tamizh Nambi pays kavimaan ₹ 100 per page for his help. How much money does kavimaan receive?

Solution :

Total no. of pages = 35 pages

- 5 pages per day

$$\begin{aligned} \text{No. of days} &= \frac{\text{Total no. of pages}}{5 \text{ pages per day}} \\ &= \frac{35}{5} \\ &= 7 \text{ days} \end{aligned}$$

- Four pages contained = 1800 characters
1 page contained = 450 characters
35 pages contained = 450 × 35
= 15,750 characters

iii) Tamizh Nambi paid = ₹ 250 per page

$$\text{He lose} = ₹ 250 \times 35$$

$$= ₹ 8750$$

iv) Lost page = 35 pages

Kavimaan helps Tamizh Nambi = 7 pages per day

$$\text{Recreate the work lost} = \frac{35 \text{ pages}}{7 \text{ pages perday}}$$

$$= 5 \text{ days}$$

v) Tamizh pays Kavimaan per page = ₹ 100

$$\text{Tamizh pays Kavimaan for 35 pages} = ₹ 100 \times 35$$

$$= ₹ 3500$$

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

Solution : Let x be the number

i) add 2 to me = $x + 2$

ii) multiply by 5 = $5(x + 2)$

iii) subtract 10 = $5(x + 2) - 10$

iv) Divide by 4 = $\frac{5(x + 2) - 10}{4}$

I will give 15

$$\frac{5(x + 2) - 10}{4} = 15$$

$$5x + 10 - 10 = 15 \times 4$$

$$5x = 60$$

$$x = 12$$

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 :

No. of Apples = 30

No. of Pomegranates = 50

Cost of Apples = ₹ 30 × ₹ 8 = ₹ 240

Cost of Pomegranates = ₹ 50 × (-5) = - ₹ 250

$$\Rightarrow 240 + (-250) = -10$$

Loss ₹ 10

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 in a dam

$$= 3 \text{ inches per week}$$

$$\text{Water level in 6 week} = 6 \times 3$$

$$= 18 \text{ inches}$$

Decreases 18 inches in 6 weeks.

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 :

$$\text{Buddha was born} = 563 \text{ BC}$$

$$= - 563$$

$$\text{Died} = 483 \text{ BC}$$

$$= -483$$

Yes he was alive in 500 BC.

$$\text{His life time} = (-483) - (-563)$$

$$= - 482 + 563$$

$$= 80 \text{ years}$$

Exercise : 1.6

Miscellaneous Practice Problems

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

Solution : Let x be the integer

$$(-1) + x = 10$$

$$x = 10 + 1$$

$$\boxed{x = 11}$$

$$2. -70 + 20 = \square - 10$$

Solution :

$$-70 + 20 = x - 10$$

$$-70 + 20 + 10 = x$$

$$\boxed{x = -40}$$

3. Subtract 94860 from (-86945)

Solution :

$$(-86945) - (94860)$$

$$= (-86945) + (-94860)$$

$$= - 1,81,805$$

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

Solution :

$$(-25) + 60 + (-95) + (-385)$$

$$= 60 + (-505)$$

$$= - 445$$

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

Solution :

$$(-9999) + (-2001) + (-5999)$$

$$= -17,999$$

6. Find the product of $(-30) \times (-70) \times (15)$

Solution :

$$(-30) + (-70) \times 15$$

$$= 2100 \times 15$$

$$= 31,500$$

7. Divide (-72) by 8

Solution :

$$\frac{(-72)}{8} = -9$$

8. Find two pairs of integers whose product is +15

Solution :

$$(-3) \times (-5) = 15$$

$$(3) \times (5) = 15$$

$$(-3) \times (-5), 3 \times 5$$

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) $(11 + 7) + 10 = 18 + 10 = 28$

$$11 + (7 + 10) = 11 + 17 = 28$$

$$\text{Equal } (28 = 28)$$

ii) $(8 - 13) \times 7 = (-5) \times 7 = -35$

$$8 - (13 \times 7) = 8 - 91 = -83$$

$$\text{Not Equal } (-35 \neq -83)$$

iii) $[(-6) - (+8)] \times (-4) = [(-6) + (-8)] \times (-4)$

$$= [(-14) + (-4)] = 56$$

$$[(-6) - [8 \times (-4)]] = (-6) - (-32)$$

$$= -6 + 32 = 26$$

$$\text{Not equal } [56 \neq 26]$$

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

$$[3 \times (-4) + 3 \times (-10)] = [(-12) + (-30)]$$

$$= -42$$

$$\text{Equal } (-42 = -42)$$

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 withdrew ₹ 500 in March?

Solution :

$$\text{Kalaivani deposited} = ₹ 5000 + ₹ 2000$$

$$= ₹ 7000$$

$$\text{Withdraw} = ₹ 7000 - ₹ 700$$

$$= ₹ 6,300$$

$$\text{Balance on 01.04.2018 is } ₹ 6,300$$

$$\text{Deposited} = ₹ 6,300 + ₹ 1,000$$

$$= ₹ 7,300$$

$$\text{Withdrew} = ₹ 7,300 - ₹ 500$$

$$= ₹ 6,800$$

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

Solution :

The price of an item = ₹ $x + 10$ every year

The price of an item = ₹ $y - 15$ every year

In 2018, $x = ₹ 50$, $y = ₹ 90$

The cost of price of an item in 2020

$$= ₹ x + 30$$

$$= 50 + 30 = ₹ 80$$

The price of an item in 2020

$$= ₹ y - 45$$

$$= ₹ 90 - 45 = ₹ 45$$

The item x will be costlier in 2020.

12. Match the statements in column A and column B

| S.No | A | B |
|------|---|--|
| 1. | For any two integers 72 and 108, $72 + 108$ is 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

13. Say true or false

- The sum of a positive integer and a negative integer is always a positive integer.
- The sum of two integers can never be zero.
- The product of two negative integers is a positive integer.
- The quotient of two integers having opposite sign is a negative integer.
- The smallest negative integer is -1 .

Solution :

- i) False ii) False iii) True iv) True v) False

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

Solution :

Let x be the integer

$$\frac{x}{7} = -3$$

$$x = -3 \times 7 = -21$$

\therefore The integer is -21

15. Replace the question mark with suitable integer in the equation
 $72 + (-5) - \boxed{?} = 72$

Solution :

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

$$\cancel{72} + (-5) - \cancel{72} = x$$

$$\boxed{x = -5}$$

16. Can you give 5 pairs of single digit integers whose sum is zero?

Solution :

$$(+1) + (-1) = 0$$

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

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

$$(+4) + (-4) = 0$$

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

The answer is not unique. You can take any single digit with its additive inverse.

17. If $P = -15$ and $Q = 5$ find $(P - Q) \div (P + Q)$

Solution :

$$(P - Q) \div (P + Q)$$

$$= \frac{P - Q}{P + Q} = \frac{(-15) - 5}{(-15) + 5}$$

$$= \frac{(-15) + (-5)}{(-15) + 5}$$

$$= \frac{-20}{-10}$$

$$\frac{P - Q}{P + Q} = 2$$

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 O to Z correspond from -1 to -12, find the sum of integers for the names given below.

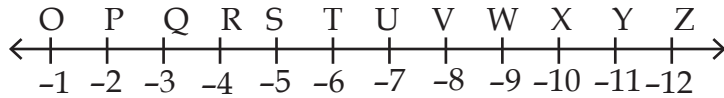
For example,

$$\text{MATH} \rightarrow \text{sum} \rightarrow 13 + 1 - 6 + 8 = 16$$

i) YOUR NAME ii) SUCCESS

Solution :





i) YOUR NAME

$$\begin{aligned}
 &= (-11) + (-1) + (-7) + (-4) + 0 + \\
 &(1) + 13 + 5 \\
 &= (-23) + 19 \\
 &= -4
 \end{aligned}$$

ii) SUCCESS

$$\begin{aligned}
 &= (-5) + (-7) + 3 + 3 + \cancel{5} + (\cancel{5}) + (-5) \\
 &= (-17) + 6 \\
 &= -11
 \end{aligned}$$

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 :Let x be the water in the tank before 10 days

$$x - 100 \times 10 = 2000 \text{ litres}$$

$$x - 1000 = 2000$$

$$x = 2000 + 1000$$

$$x = 3000 \text{ litres of water}$$

20. A dog is climbing down in to 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 :

$$\text{Water level} = 20 \text{ step}$$

$$\text{Each jump} = 4 \text{ step}$$

$$\text{No. of Jumps} = \frac{20}{4} = 5 \text{ jumps}$$

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

Solution :

$$\text{No. of banana} = 1 \text{ dozen}$$

$$= 12$$

$$\text{Loss of 1 banana} = ₹ 2$$

$$\text{Loss of Total Banana} = ₹ 12 \times 2 = ₹ 24$$

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

Solution :

Sea level is 0 feet

Negative sign represents marine is below sea level

Submarine situated = - 650 feet
 Descends = - 200 feet
 New position = - 850 feet
 850 feet below the sea level.

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

| | | |
|----|-----|----|
| 1 | -10 | x |
| y | -3 | -2 |
| -6 | 4 | z |

Solution :

Row:

$$(1) + (-10) + x = y + (-3) + (-2) = (-6) + 4 + z$$

$$-9 + x = y + (-5) = (-2) + z$$

Column:

$$1 + y + (-6) = (-10) + (-3) + 4 = x + (-2) + z$$

$$y + (-5) = (-13) + 4 = x + z \quad (-2)$$

$$y + (-5) = -9$$

$$y = (-9) - (-5)$$

$$= (-9) + 5$$

$$\boxed{y = -4}$$

$$-9 + x = y + (-5) = (-4) + (-5)$$

$$-9 + x = -9$$

$$x = -9 + 9 = 0$$

$$\boxed{x = 0}$$

$$-9 + x = -2 + z$$

$$-9 + 0 = -2 + z$$

$$Z = -9 + 2$$

$$\boxed{z = -7}$$

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

SUMMARY

- Integers are the collection of natural numbers, zero and negative numbers.
- The number line gives a visual representation of the set of all integers with positive integers to the right of zero and negative integers to the left of zero.
- The sum of the two positive integers is positive and two negative integers is negative.
- The sum of a positive and a negative integer is the difference of the two numbers in value and has the sign of the greater integer.
- The addition of integers has the closure, commutative and associative properties.
- The product of two positive integers and two negative integers are positive.
- The product of two integers with opposite signs is negative.
- The multiplication of integers has the closure, commutative and associative properties.
- The integer 0 is the additive identity for integers.
- The integer 1 is the multiplicative identity for integers.