DEBOLINA GHOSH

MATHEMATICS TEACHER

RBS SENIOR SECONDARY, CR PARK

CLASS VII

CHAPTER 1

INTEGERS

- A whole number, from zero to positive or negative infinity is called **Integers**. I.e. it is a set of numbers which include zero, positive natural numbers and negative natural numbers. It is denoted by letter Z.

  Z = {…,-2,-1, 0, 1, 2…}
- Closure under addition- If we have two integers p and q, p + q is an integer.
- Closure under subtraction- For any two integers p and q, p - q is an integer.
- Addition is commutative for integers.
- Subtraction is not commutative for integers.
- Associative identity- For any three integers, p, q and r
  p + (q + r) = (p + q) + r
- Additive Identity- For any integer p,
  p + 0 = 0 + p =p
- Closure for multiplication- For all the integers p and q
  p×q = r, where r is an integer

- multiplication is commutative for integers.
  For any two integers p and q
  p × q = q × p
- For any integer p, p × 0 = 0 × p = 0
- For any integer q, q × 1 = 1 × q = q
- For any three integers, p, q and r, p × (q × r) = (p × q) × r
- Distributivity of Multiplication over Addition.
  For any integers a, b and c, a × (b + c) = (a × b) + (a × c)
- Distributivity of multiplication over subtraction
  For any integers a, b and c, a × (b – c) = (a × b) – (a × c)
- For any integers p and q,

(– p) ÷ q = p ÷ (- q) = - (p ÷ q) where, q ≠ 0

- The division is not closed under division.
- The division is not commutative for integer
- Division is not Associative for integers.

Q 1. In a quiz, positive marks are given for correct answers and negative marks are given for incorrect answers. If jack's scores in five successive rounds were 25, − 5, − 10, 15 and 10, what was his total at the end?

Ans. Jack's scores in five successive rounds are 25, −5, −10, 15, and 10. Total score of Jack at the end will be the sum of these scores. Therefore, Jack's total score at the end = 25 − 5 − 10 + 15 + 10 = 35.

Q 2. Verify $a - (-b) = a + b$ for the following values of a and b.

(i) $a = 21, b = 18$

(ii) $a = 118, b = 125$

Ans. (i) $a = 21, b = 18$

$a - (-b) = 21 - (-18) = 21 + 18 = 39$

$a + b = 21 + 18 = 39$

$\therefore a - (-b) = a + b = 39$

(ii) $a = 118, b = 125$

$a - (-b) = 118 - (-125) = 118 + 125 = 243$

$a + b = 118 + 125 = 243$

$\therefore a - (-b) = a + b = 243$

Q 3. Fill in the blanks to make the following statements true:

(i) (− 5) + (− 8) = (− 8) + (…)

(ii) − 53 + … = − 53

(iii) 17 + … = 0

Ans. i) $(-5)+(-8)=(-8)+(\underline{\quad -5 \quad})$

(ii) $-53+\underline{\quad 0 \quad}=-53$

(iii) $17+(\underline{\quad -17 \quad})=0$

Q 4. In a class test containing 10 questions, 5 marks are awarded for every correct answer and (− 2) marks are awarded for every incorrect answer and 0 for questions not attempted.

(i) Mohan gets four correct and six incorrect answers. What is his score?

(ii) Reshma gets five correct answers and five incorrect answers, what is her score?

Ans. (i) Marks given for 1 correct answer = 5

Marks given for 4 correct answers = 5 × 4 = 20

Marks given for 1 wrong answer = −2

Marks given for 6 wrong answers = −2 × 6 = −12

Score obtained by Mohan = 20 − 12 = 8

(ii) Marks given for 1 correct answer = 5

Marks given for 5 correct answers = 5 × 5 = 25

Marks given for 1 wrong answer = −2

Marks given for 5 wrong answers = −2 × 5 = −10

Score obtained by Reshma = 25 − 10 = 15

Q 5. Replace the blank with an integer to make it a true statement.

(a) $(-3)\times \_\_\_\_\_ = 27$

(b) $5\times \_\_\_\_\_ = -35$

Ans. (a) $(-3)\times \underline{\ (-9)\ } = 27$

(b) $5\times \underline{\ (-7)\ } = -35$

Q 6. Verify that $a \div (b + c) \neq (a \div b) + (a \div c)$ for each of the following values of a, b and c.

(a) $a = 12$, $b = -4$, $c = 2$

(b) $a = (-10)$, $b = 1$, $c = 1$

Ans. (a) $a = 12$, $b = -4$, $c = 2$

$a \div (b + c) = 12 \div (-4 + 2) = 12 \div (-2) = -6$

$(a \div b) + (a \div c) = [12 \div (-4)] + [12 \div 2] = -3 + 6 = 3$

Hence, $a \div (b + c) \neq (a \div b) + (a \div c)$

(b) $a = -10$, $b = 1$, $c = 1$

$a \div (b + c) = (-10) \div (1 + 1) = (-10) \div 2 = -5$

$(a \div b) + (a \div c) = [(-10) \div 1] + [(-10) \div 1] = -10 - 10 = -20$

Hence, $a \div (b + c) \neq (a \div b) + (a \div c)$

Q 7. In a class test (+ 3) marks are given for every correct answer and (−2) marks are given for every incorrect answer and no marks for not attempting any question. (i) Radhika scored 20 marks. If she has got 12 correct answers, how many questions has she attempted incorrectly? (ii) Mohini scores − 5 marks in this test, though she has got 7 correct answers. How many questions has she attempted incorrectly? (iii) Rakesh scores 18 marks by attempting 16 questions. How many questions has he attempted correctly and how many has he attempted incorrectly?

Ans. Marks obtained for 1 right answer = +3

Marks obtained for 1 wrong answer = −2

(i) Marks scored by Radhika = 20

Marks obtained for 12 correct answers = 12 × 3 = 36

Marks obtained for incorrect answers = Total score − Marks obtained for 12 correct answers

= 20 − 36 = −16

Marks obtained for 1 wrong answer = −2

Thus, number of incorrect answers = (−16) ÷(−2) = 8

Therefore, she attempted 8 questions wrongly.

(ii) Marks scored by Mohini = −5

Marks obtained for 7 correct answers = 7 × 3 = 21

Marks obtained for incorrect answers = Total score − Marks obtained for 12 correct answers

= − 5 − 21 = −26

Marks obtained for 1 wrong answer = −2

Thus, number of incorrect answers = (−26) ÷(−2) = 13

Therefore, she attempted 13 questions wrongly.

(iii) Total marks scored by Rakesh = 18

Number of questions attempted = 16

(Number of correct answers)(3) + (Number of incorrect answers)(−2) = 18

⇒(Number of correct answers)(3) + (16 − Number of correct answers)(−2) = 18

⇒(Number of correct answers)(3) + −32 + 2(Number of correct answers) = 18

⇒(Number of correct answers)(5) + −32 = 18

⇒(Number of correct answers)(5) = 18 + 32 = 50

⇒ Number of correct answers = 10

∴Number of incorrect answers = 16 − 10 = 6

∴Total number of correct and incorrect answers scored by Rakesh is 10 and 6 respectively.

Q 8. An elevator descends into a mine shaft at the rate of 6 m/min. If the descent starts from 10 m above the ground level, how long will it take to reach − 350 m.

ANSWER:

Distance descended is denoted by a negative integer.

Initial height = +10 m

Final depth = −350 m

Total distance to be descended by the elevator = (−350) − (+10) = −360 m

Time taken by the elevator to descend −6 m = 1 min

Thus, time taken by the elevator to descend −360 m = (−360) ÷ (−6)

= 60 minutes = 1 hour

Q 9. A certain freezing process requires that room temperature be lowered from 40°C at the rate of 5°C every hour. What will be the room temperature 10 hours after the process begins?

Ans. Initial temperature = 40°C

Change in temperature per hour = −5°C

Change in temperature after 10 hours = (−5) × 10 = −50°C

Final temperature = 40ºC + (−50ºC) = −10°C

Q 10. Evaluate each of the following:

(a) $(-30) \div 10$ (b) $50 \div (-5)$

(c) $(-36) \div (-9)$ (d) $(-49) \div (49)$

Ans. (a) (−30) ÷ 10 = −3

(b) 50 ÷ (−5) = −10

(c) (−36) ÷ (−9) = 4

(d) (−49) ÷ 49 = −1