Case Study 2

Meena is a Class 7 student who lives near a coastal town. Her school conducts a weekly activity where students observe real-life uses of mathematics. During one such week, Meena recorded changes in sea level during high and low tides. On Monday morning, the sea level was measured as -2 metres below the reference point. By afternoon, due to high tide, the sea level rose by 6 metres. In the evening, the tide went down again and the sea level decreased by 5 metres.

At the same time, Meena participated in a school charity drive where students earned and lost points based on their activities. She earned 20 points for collecting donations but lost 12 points because she submitted her report late. Later that day, she earned another 8 points for helping her classmates. Meena used integers to calculate her total score.

Meena's father works in a warehouse where daily stock changes are recorded using integers. On the same day, 150 items were added to the stock, while 95 items were sold. Meena helped her father calculate the net change in stock using addition and subtraction of integers. Through these daily activities, Meena understood how integers are useful in representing gains, losses, increases, and decreases in real-life situations.

Questions

1. What was the sea level in the afternoon after the rise?

   (a) (A) -8 m
   (b) (B) 4 m
   (c) (C) -4 m
   (d) (D) 8 m

2. What was the sea level in the evening after the decrease?

   (a) (A) -1 m
   (b) (B) 1 m
   (c) (C) 9 m
   (d) (D) -9 m

3. What is Meena's final score in the charity drive?

   (a) (A) 16
   (b) (B) -4
   (c) (C) 28
   (d) (D) 0

4. What integer represents the net change in warehouse stock?

   (a) (A) -245
   (b) (B) 245
   (c) (C) 55
   (d) (D) -55

5. Which integer represents the decrease in sea level during the evening?

   (a) (A) $+5$
   (b) (B) -5
   (c) (C) $+6$
   (d) (D) -6

Answer Key

- Q1: (B)

- Q2: (A)

- Q3: (A)

- Q4: (C)

- Q5: (B)

Solutions

1. Morning sea level $= -2$ m. Rise $= +6$ m.

$$-2 + 6 = 4$$

Therefore, the afternoon sea level was 4 metres.

2. Afternoon sea level $= 4$ m. Decrease in the evening $= -5$ m.

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

Hence, the sea level in the evening was -1 metre.

3. Points earned $= +20$, points lost $= -12$, points earned again $= +8$.

$$20 + (-12) + 8 = 16$$

Meena's final score was 16 points.

4. Items added $= +150$, items sold $= -95$.

$$150 + (-95) = 55$$

The net change in stock was an increase of 55 items.

5. The sea level went down by 5 metres in the evening. A decrease is represented by a negative integer. Therefore, the correct integer is -5.