Unit 3 · Integers

HARDER PRACTICE QUESTIONS

Full marks 32

Write your answers on separate paper. Draw a number line wherever it helps, and give a reason for each answer.

1 Up and down in a lift [4]

In a shopping building, the ground floor is 0, the floors above it are 1 to 5, and the three basement floors are B1, B2 and B3. (The building is made up for the problem.)

i. Write B1, B2 and B3 as integers.

ii. Kritika gets in at floor 2. The lift goes down 4 floors, then up 1, then down 2. On which floor does she get out? Write it as an integer and as the button she would press.

iii. How many floors does the lift pass from B3 up to floor 5, not counting B3 and 5?

2 Spot the errors [3]

Sagun wrote: "$-8 > -3$, because 8 is bigger than 3. So in ascending order the numbers -3, -8 and 0 are -3, -8, 0."

i. Which of his statements is wrong? Correct it.

ii. Write the three numbers in ascending order.

iii. Give a rule that would have stopped his mistake.

3 Who am I? [3]

I am an integer. I am greater than -4 and less than 3. I am to the left of the origin. I am further from 0 than -2 is.

i. List the integers that fit the first two clues.

ii. Which of them also fit the third clue?

iii. Who am I?

4 Counting the integers between [3]

Without writing them all out, find how many integers lie between:

i. -13 and 9;

ii. -20 and -5.

iii. Rohit says, "There are 7 integers between -4 and 4, because $4 + 4 = 8$ and you leave one out." Is he right? Explain.

5 Halfway [4]

On a number line, point A is at -7 and point B is at 5.

i. How many steps apart are A and B?

ii. Point M is exactly halfway between A and B. Which integer is M?

iii. Point C is as far to the left of A as M is to the right of A. Which integer is C?

iv. Write A, B, C and M in descending order.

6 Always, sometimes or never? [4]

Is each statement always true, sometimes true or never true? Give an example for each.

i. A negative integer is less than every positive integer.

ii. Of two integers, the one further from 0 is the bigger one.

iii. There is at least one integer between any two different negative integers.

iv. The point exactly halfway between two integers is an integer.

7 Saving and owing [4]

Five friends write their money as integers: money they have saved is positive, and money they owe is negative. Aayush has Rs 120. Salina owes Rs 90. Mingma has nothing and owes nothing. Pasang has Rs 35. Kriti owes Rs 40. (The amounts are made up.)

i. Write each person's money as an integer.
ii. Put the five integers in ascending order.
iii. Whose integer is furthest from 0? Is that person the richest?
iv. Kriti pays back what she owes and then saves Rs 10. How many steps did her integer move, and which way?

8 Make your own [3]

Write five different integers that obey all these rules:

- every one is between −10 and 10;
- exactly two of them are negative;
- 0 is not one of them;
- the smallest and the largest are 12 steps apart.

Write them in ascending order, and show that every rule holds.

9 Think: from the bottom of the well [4]

A family's well is 12 m deep, and the water tank on their roof is 9 m above the ground. Take the ground as 0. (The heights are made up.)

i. Write the bottom of the well and the top of the tank as integers.
ii. A pump lifts water from the bottom of the well to the tank. How far does the water rise?
iii. The water in the well is 4 m below the ground in the rainy season and 10 m below it in the dry season. In which season does the pump lift the water further, and by how many meters?