# Describing routes and relative positions

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

**1.** Start at $(0, 0, 0)$. Move 2 in positive $x$, 3 in positive $y$ and 1 in positive $z$. Give the endpoint. [2 marks]

Apply each change to its matching entry.

**Answer:** $(2, 3, 1)$

**2.** Start at $(3, 2, 1)$. Move 2 in negative $y$. Give the endpoint. [2 marks]

$2 - 2 = 0$ in the $y$-entry.

**Answer:** $(3, 0, 1)$

**3.** Start at $(1, 1, 1)$. Move 4 in positive $x$ then 2 in negative $x$. Give endpoint and distance. [2 marks]

Final $x = 1 + 4 - 2 = 3$. $\text{Distance} = 4 + 2 = 6$.

**Answer:** $(3, 1, 1)$; 6 units.

**4.** Describe the change from $A(2, 5, 1)$ to $B(2, 1, 4)$. [2 marks]

Compare corresponding entries: $\Delta x = 0$, $\Delta y = -4$, $\Delta z = 3$.

**Answer:** 4 units in negative $y$ and 3 units in positive $z$; $x$ stays unchanged.

**5.** Find the length of an axis-aligned route from $(1, 2, 3)$ to $(4, 1, 5)$ without reversing direction. [2 marks]

The leg lengths are 3, 1 and 2. Add: $3 + 1 + 2 = 6$.

**Answer:** 6 units.

**6.** Mia says returning to the start means the total distance is zero. She walks 3 units out and 3 back. Correct her. [2 marks]

Both legs contribute distance: $3 + 3 = 6$.

**Answer:** Her final position change is zero, but she travels 6 units.