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Position Needs an Origin and a Direction

1. "200 m" is not enough

A position on a straight line needs an **origin** (reference point, O) and a chosen **positive direction**. Points on the other side are **negative**. Position = **sign + number + unit**.

2. Worked example

Place	Origin: home	Origin: school
School	−150 m	0
Home	0	+150 m
Shop	+200 m	+350 m

Displacement home → shop = final − initial = 200 − 0 = 350 − 150 = **+200 m**: changing the origin changes positions, not displacement.

Key takeaways

- Always state the origin and the positive direction.
- Negative = on the other side of the origin.
- Displacement does not depend on the origin.

Practice questions

1. (MCQ) Home is the origin, right is +. A shop 200 m left is at (a) +200 m (b) −200 m (c) 0 (d) 200
2. (Very short) What is the position of the origin itself?
3. (Numerical) School −150 m, shop +200 m: find the distance between them.
4. (Numerical) Take the school as origin: find the positions of home and shop and the displacement home → shop.
5. (Short) Why is "200 m" not a complete position?

Answer key

1. (b).
2. 0.
3. 200 − (−150) = 350 m.
4. Home +150 m, shop +350 m, displacement +200 m.
5. It gives neither the origin nor the direction.

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