# Year 8 Bearings and Transformations – Revision Notes

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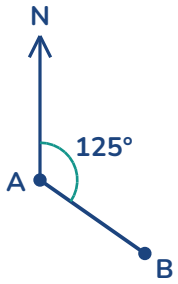
Year 8 · Maths · Bearings, Coordinates and Transformations · Key ideas and worked examples

**For grown-ups and learners:** read each part and try the worked example. Then work through the sheets: Foundation, Developing, Challenge, then Mixed Practice to revise everything. Show your working: it earns marks in tests and helps you spot mistakes.

## 1. Bearings

A **bearing** is a direction measured **clockwise from north**, written with three figures: east is 090°, south is 180°. If the bearing of B from A is 070°, the bearing of A from B is 070° + 180° = **250°** (the **back bearing**).




**Example:** The bearing of B from A is 025°. Find the bearing of A from B.
→ The back bearing differs by 180°: 25 + 180 = 205°
**Answer: 205°**

## 2. Midpoints and vectors

The **midpoint** of a line segment is halfway along it: add the x-coordinates and halve, and add the y-coordinates and halve. For example, (−2, 5) and (6, 1) have midpoint (2, 3). A translation **vector** (a, b), written as a column vector in your book, moves every point a across and b up.

**Example:** Find the midpoint of the line segment from (−5, 7) to (4, −7).
→ ((−5 + 4) ÷ 2, (7 + −7) ÷ 2) = (−0.5, 0)
**Answer: (−0.5, 0)**

## 3. Reflections, rotations and enlargements

Reflecting in **y = x** swaps the coordinates: (3, 1) → (1, 3). To describe a **rotation** you need its **centre**, its **angle** and its **direction**. An **enlargement** with scale factor 2 and centre O makes every point twice as far from O. Reflections, rotations and translations give congruent images; enlargements give similar ones.

**Example:** A translation maps P (−3, −3) to P' (2, −9). Write the translation vector.
→ Changes in x and y: 2 − (−3) = 5, −9 − (−3) = −6
**Answer: (5, −6)**

**Think like a mathematician:** test a few cases (**specialising**), look for the rule that always works (**generalising**), and explain why you are sure (**convincing**). When you check someone's working, say what is wrong and how to **improve** it.

**Common mistakes:** measuring a bearing anticlockwise or from east. Writing a back bearing over 360°. Subtracting instead of adding for a midpoint. Measuring an enlargement from the wrong point.