# Year 8 Bearings and Transformations – Challenge

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Answers and worked solutions · 8 questions

## A. Think like a mathematician

**1.** **a rotation of 90° clockwise about the origin**

(3, 2) → (2, −3), (2, 1) → (1, −2), (2, 4) → (4, −2)
Look at how the coordinates change: a rotation of 90° clockwise about the origin
Check: the image is the same shape and size (congruent)

**2.** **The midpoint is the mean of the coordinates: add, then halve. Midpoint = (1, 2).**

Error: the coordinates were subtracted
Add the x-coordinates and halve; add the y-coordinates and halve
= (1, 2)

**3.** **Bearings are less than 360°, so subtract 180° instead: 105°.**

Error: a bearing cannot be more than 360°
The back bearing differs by 180°
285 − 180 = 105°

**4.** **No. Each length doubles, so the area is multiplied by 2 × 2 = 4.**

Try an example
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Decide

**5.** **No. You also need the centre of rotation and the direction (clockwise or anticlockwise).**

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Decide

**6.** **Yes. The second vector undoes the first: (3, −2) + (−3, 2) = (0, 0).**

Try an example
The second vector undoes the first: (3, −2) + (−3, 2) = (0, 0).
Decide

**7.** **(1, 0)**

Add the vector: (−4 + 5, −2 + 2) = (1, 0)

**8.** **(−3, 3.5)**

((−7 + 1) ÷ 2, (6 + 1) ÷ 2) = (−3, 3.5)