Guide to:
Combined transformations

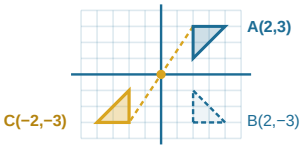
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Explanation:

For combined transformations, apply the first transformation to the original shape to draw an intermediate image, then apply the second transformation to that intermediate image.

When asked to describe the **single transformation** that maps the starting shape directly onto the final shape, check whether the orientation has flipped (reflection) or stayed the same (rotation/translation). Two reflections in perpendicular axes (such as the x-axis and y-axis) are equivalent to a **rotation of 180°** about their intersection.

Example 1: Shape A has corner **(2, 3)**. It is reflected in the **x-axis** to give B, then B is reflected in the **y-axis** to give C. Describe the single transformation from A to C.



Solution:

(2, 3) → B(2, −3) → C**(−2, −3)**, so (x, y) → (−x, −y)

Answer: Rotation of 180° about (0, 0)

Example 2: Shape P is translated by vector **(4, −1)** to give Q, then Q is translated by **(−6, 5)** to give R. Describe the single transformation from P to R.

Solution:

Add the two translation vectors together:
Horizontal: 4 + (−6) = **−2**
Vertical: −1 + 5 = **4**
Answer: Translation by column vector (−2, 4)

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