Translations as vectors

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Translate $(4, -2)$ by $(3, 5)$. [2 marks]

Add the corresponding components.

Answer: $(7, 3)$.

2. Find the displacement from $(-1, 6)$ to $(3, 2)$. [2 marks]

Subtract start from finish.

Answer: $(4, -4)$.

3. Translate by $(-4, 2)$, then by $(1, -5)$. State the single equivalent translation. [2 marks]

Add the displacement vectors.

Answer: $(-3, -3)$.

4. Explain why no 2×2 matrix alone sends every point two units right. [2 marks]

The origin would need to move to $(2, 0)$, contradicting $A0 = 0$.

Answer: Every matrix fixes the origin.

5. Find p if $3p + (2, -1) = (8, 5)$. [2 marks]

Subtract $(2, -1)$ to obtain $(6, 6)$.

Divide by 3.

Answer: $p = (2, 2)$.

6. Under a translation, $P = (1, 4)$ becomes $(6, 2)$. Find the image of $Q = (-2, 0)$. [2 marks]

The translation vector is $(5, -2)$.

Add this to Q.

Answer: $(3, -2)$.