Transformations and Vectors

Geometry and measures · 6 questions · step-by-step answers at the end

Name: Date: Score: / 6

USEFUL EQUATIONS

$AB = b - a$ $|(x, y)| = \sqrt{(x^2 + y^2)}$ $k(x, y) = (kx, ky)$ $OM = (1/2)(a + b)$

Questions

Show your working in the space under each question.

1. EASY Reflect the point $(3, -2)$ in the x-axis and in the line $y = x$.

2. EASY Rotate $(4, 1)$ by $90°$ anticlockwise about the origin.

3. MEDIUM $a = (3, 4)$. Find $|a|$ and $2a$.

4. MEDIUM $a = (2, 5)$ and $b = (-1, 3)$. Find $a + b$ and $a - 2b$.

5. HARD Find the image of (1, 3) under an enlargement of scale factor −2, centre the origin.

6. HARD OA = a, OB = b, OC = 3a and OD = 3b. Show that CD is parallel to AB and compare their lengths.

Step-by-step answers

Transformations and Vectors

1. In the x-axis: **(3, 2)**. In y = x, swap the coordinates: **(−2, 3)**.
2. (x, y) → (−y, x): **(−1, 4)**.
3. |a| = √(9 + 16) = **5**. 2a = **(6, 8)**.
4. a + b = **(1, 8)**. a − 2b = (2 + 2, 5 − 6) = **(4, −1)**.
5. Multiply by −2: **(−2, −6)**, on the opposite side of the origin and twice as far away.
6. AB = b − a. CD = 3b − 3a = 3(b − a) = 3AB. CD is a multiple of AB, so they are **parallel**, and CD is **3 times as long**.