Distance and midpoint

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Find the distance between (1,2) and (4,6). [2 marks]

$d = \sqrt{3^2 + 4^2} = 5$.

Answer: 5

2. Find the exact distance between (-1,3) and (4,5). [2 marks]

$d = \sqrt{5^2 + 2^2} = \sqrt{29}$.

Answer: $\sqrt{29}$

3. Find the midpoint of (-5,-2) and (3,8). [2 marks]

((-5+3)/2,(-2+8)/2)=(-1,3).

Answer: (-1,3).

4. A segment has endpoint (2,7) and midpoint (-1,4). Find its other endpoint. [2 marks]

Let Q=(a,b). Then 2+a=-2 and 7+b=8, so a=-4 and b=1.

Answer: (-4,1).

5. Show that the triangle with vertices (0,0), (4,0) and (2,3) is isosceles. [2 marks]

Each sloping side has horizontal change of magnitude 2 and vertical change of magnitude 3.

Their equal lengths establish the isosceles claim.

Answer: The two sloping sides both have length $\sqrt{13}$.

6. A map uses kilometres on both axes. Two stations are at (-3,2) and (5,-4). Find their straight-line separation and explain why this may not be the road distance. [2 marks]

$d = \sqrt{8^2 + (-6)^2} = 10$ km.

The formula measures the direct geometric distance, not a route following roads.

Answer: 10 km; roads need not follow the straight segment.