Unit 17 · Coordinates

HARDER PRACTICE QUESTIONS

Full marks 28

Write your answers on separate paper. Show your working. Use squared paper to plot the points wherever it helps. Leave roots as roots unless a question asks for a decimal.

1 Name the shape [4]

$A(1, 1)$, $B(5, 2)$, $C(6, 6)$ and $D(2, 5)$ are the corners of a quadrilateral.

i. Find its four sides.

ii. Find its two diagonals.

iii. What is the shape exactly? Why isn't it a square?

2 Right-angled or not? [3]

$P(-1, 2)$, $Q(3, 0)$ and $R(5, 4)$ are the corners of a triangle. Show that it is both isosceles and right-angled, say where the right angle is, and find its area.

3 The same distance from both [3]

Find the point on the X-axis that is the same distance from $A(1, 3)$ and $B(5, 1)$. What is that distance?

4 Is it a triangle? [3]

Yasmin plots $A(1, 1)$, $B(3, 2)$ and $C(7, 4)$ and says they make a very thin triangle. Find AB, BC and AC to two decimal places. What do you notice? Is she right?

5 Inside, on or outside? [3]

A circle has its center at $(1, -2)$ and passes through $(4, 2)$.

i. Find its radius.

ii. Is each of the points $(-3, 1)$, $(4, 0)$ and $(7, -2)$ inside the circle, on it or outside it?

6 Spot the error [3]

Find the mistake and correct it.

Rakesh found the distance between $(-2, 3)$ and $(4, -5)$:
"$\sqrt{(4-2)^2 + (-5-3)^2} = \sqrt{4 + 64} = \sqrt{68}$."

7 In a real setting [4]

On a map of a rural municipality, a health post is at $H(-3, 2)$ and two villages are at $P(3, 10)$ and $Q(5, -4)$. One unit stands for 1.5 km. (The map is made up for the problem.)

i. Find the distances HP and HQ in km.

ii. Show that the angle at H is a right angle.

iii. A nurse goes from H to P, to Q, and back to H, in straight lines. About how far is that?

8 Think [3]

How many points with whole-number coordinates are exactly 5 units from the origin? List them. (Think of $x^2 + y^2 = 25$.) Why is it not just the 4 you find on the axes?

9 Make your own [2]

Find four points with whole-number coordinates that make a square whose sides are **not** along the grid lines. Show that it is a square.