Unit 17 · Coordinates

HARDER PRACTICE QUESTIONS

Full marks 35

Write your answers on separate paper. Show your working. Draw the axes on graph paper and plot the points for every question, one unit a square. A distance is always positive: take the smaller coordinate from the bigger one.

1 Spot the errors [4]

Sapana wrote these four. Each one is wrong. Correct it, and say what went wrong.

i. The point $(-3, 0)$ is in the 2nd quadrant.
ii. The distance between $(4, -6)$ and $(4, -1)$ is $-1 - 6 = -7$ units.
iii. A point 2 units right of the Y-axis and 5 units below the X-axis is $(-5, 2)$.
iv. $(2, 3)$ and $(3, 2)$ are the same point, because they use the same numbers.

2 Signs and quadrants [4]

i. A point's x-coordinate is positive and its y-coordinate negative. In which quadrant is it?
ii. $P(a, b)$ is in the 2nd quadrant. In which quadrant is $Q(b, a)$?
iii. In which quadrant is $S(a, -b)$?
iv. Where are all the points whose x-coordinate is 0?

3 The classroom plan [4]

On a plan of a classroom floor, one unit is a meter. Three corners of the floor are $A(-4, -3)$, $B(5, -3)$ and $C(5, 3)$.

i. Find the fourth corner, D.
ii. Find the length and breadth of the floor.
iii. Find its perimeter and its area.
iv. Shristi says the origin is the middle of the floor. Is she right? If not, where is the middle?

4 Points on a line [4]

$A(-6, 3)$ and $B(4, 3)$ are on one line across.

i. Find the distance AB.
ii. Find the point halfway between A and B.
iii. Find the point on AB that is 4 times as far from A as from B.
iv. Find every point that is 4 units from $C(2, -1)$, on the line up and down through C.

5 A shape round the origin [4]

Plot $A(-3, 0)$, $B(0, 4)$, $C(3, 0)$ and $D(0, -4)$, and join them in order.

i. Find the lengths of the diagonals AC and BD.
ii. Where do the diagonals cross, and at what angle? Do they bisect each other?
iii. Use Pythagoras' theorem in $\triangle AOB$ to find AB.
iv. Are all four sides equal? Give a reason.

6 The walk [4]

Anjila starts at $(-4, -1)$. She walks 3 units right, then 5 up, then 6 left, then 2 down.

i. Write the point she reaches after each part of the walk.
ii. In which quadrant does she finish?
iii. How far did she walk in all?
iv. What single move across and single move up or down would take her straight back to the start?

7 An L-shaped plot [4]

A plot of land has six corners: $(-4, -3)$, $(5, -3)$, $(5, 1)$, $(1, 1)$, $(1, 4)$ and $(-4, 4)$, joined in that order. One unit is a meter.

i. Plot it and find the length of each side.
ii. Find the perimeter.
iii. Cut it into two rectangles and find its area.
iv. A wall is built along the side from $(5, -3)$ to $(5, 1)$ at Rs 1,500 a meter. What does it cost?

8 Think: three steps from the origin [4]

You may walk only along grid lines. Find every point with whole-number coordinates that is exactly 3 units of walking from the origin, by the shortest way.

i. List the ones on the axes.
ii. List the ones in the 1st quadrant. How many are there in each quadrant?
iii. How many are there in all? Plot them and join them round. What shape do they make?
iv. Without listing them, how many points are exactly 5 units of walking from the origin?

9 Make your own [3]

i. Write three corners of a rectangle, each in a different quadrant, and find the fourth.
ii. Write two points 7 units apart on one line up and down, one in the 1st quadrant and one in the 4th.
iii. Write every point that is in no quadrant and 3 units from the origin.