

Coordinate Shape Quest

Graph rational points, build polygons, and measure their sides.

GRADE 6 • 6.PAR.8

6.PAR.8 "Graph rational numbers as points on the coordinate plane to represent and solve contextual, mathematical problems; draw polygons using the coordinates for their vertices and find the length of a side of a polygon."

NAME _____

DATE _____

MEASURE ALONG A SIDE

To plot (x, y) , move x units left or right, then y units up or down. For a horizontal side, subtract the x -coordinates. For a vertical side, subtract the y -coordinates. A side length is always positive.

WORKED EXAMPLE

Points $J(-7/8, 1/6)$ and $K(5/8, 1/6)$ form a horizontal segment. What is JK ?

- Both points have y -coordinate $1/6$, so JK is horizontal.
- Subtract the x -coordinates: $5/8 - (-7/8) = 12/8$.
- Simplify $12/8$ to $3/2$.

Answer: $JK = 3/2$ units.

PRACTICE 6 problems

- 1** Graph $A(-3/4, 1/2)$ and $B(1/4, 1/2)$. What is the length of AB ?

ANSWER _____

- 2** Graph $C(-2/3, -3/4)$ and $D(-2/3, 1/4)$. What is the length of CD ?

ANSWER _____

- 3** Graph $E(-1, -1/3)$, $F(2, -1/3)$, and $G(2, 2/3)$. Connect the points to make a triangle. What is the length of EF ?

ANSWER _____

- 4** Graph $H(-4/5, -1/2)$, $I(2/5, -1/2)$, $J(2/5, 1/2)$, and $K(-4/5, 1/2)$. Connect the points in order. What are the horizontal and vertical side lengths of the rectangle?

ANSWER _____

- 5** Graph $M(-1/4, -1/3)$, $N(-1/4, 1/2)$, $O(3/4, 1/2)$, and $P(3/4, -1/3)$. Connect the points in order. What is the length of MN ?

ANSWER _____

- 6** A horizontal side starts at $R(-5/6, -1/4)$ and is $7/6$ units long. Its other endpoint, S , is to the right of R . What are the coordinates of S ?

ANSWER _____

APPLY IT Show your work

- 1** A gaming club maps a rectangular arena on a coordinate plane. Its corners are $A(-\frac{3}{2}, -\frac{1}{2})$, $B(\frac{1}{2}, -\frac{1}{2})$, $C(\frac{1}{2}, \frac{3}{4})$, and $D(-\frac{3}{2}, \frac{3}{4})$. Graph and connect the corners in order. What are the length and width of the arena?

WORK SPACE

ANSWER _____

- 2** On a design app, a student makes a triangular logo with vertices $P(-\frac{5}{4}, \frac{1}{3})$, $Q(\frac{3}{4}, \frac{1}{3})$, and $R(-\frac{1}{4}, \frac{7}{6})$. Graph the points and connect them. What is the length of the horizontal side PQ?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Graph $R(-\frac{7}{4}, -\frac{1}{2})$, $S(\frac{3}{4}, -\frac{1}{2})$, $T(\frac{3}{4}, \frac{5}{4})$, and $U(-\frac{7}{4}, \frac{5}{4})$. A student says RSTU is a square. Is the student correct? Find the side lengths and explain your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Graph A(-3/4, 1/2) and B(1/4, 1/2). What is the length of AB?	AB = 1 unit.
2	Graph C(-2/3, -3/4) and D(-2/3, 1/4). What is the length of CD?	CD = 1 unit.
3	Graph E(-1, -1/3), F(2, -1/3), and G(2, 2/3). Connect the points to make a triangle. What is the length of EF?	EF = 3 units.
4	Graph H(-4/5, -1/2), I(2/5, -1/2), J(2/5, 1/2), and K(-4/5, 1/2). Connect the points in order. What are the horizontal and vertical side lengths of the rectangle?	Horizontal sides = 6/5 units; vertical sides = 1 unit.
5	Graph M(-1/4, -1/3), N(-1/4, 1/2), O(3/4, 1/2), and P(3/4, -1/3). Connect the points in order. What is the length of MN?	MN = 5/6 unit.
6	A horizontal side starts at R(-5/6, -1/4) and is 7/6 units long. Its other endpoint, S, is to the right of R. What are the coordinates of S?	S = (1/3, -1/4).

PART 2 • APPLY IT

- Length = 2 units; width = 5/4 units.** The horizontal distance from -3/2 to 1/2 is 2 units. The vertical distance from -1/2 to 3/4 is 5/4 units.
- PQ = 2 units.** P and Q have the same y-coordinate, so PQ is horizontal. The distance from -5/4 to 3/4 is 2 units.

CHALLENGE

No. RS and TU are 5/2 units, while ST and UR are 7/4 units. A square must have four equal side lengths.

Accept equivalent positive rational forms, such as 10/8 for 5/4. For rectangle dimensions, accept the two side lengths in either order if the horizontal and vertical labels are clear.