Polygons on the Coordinate Plane

Polygons on the coordinate plane: Applications and decisions

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QUICK REVIEW

Plot vertices in their named order and close the polygon. For horizontal sides, subtract the smaller x from the larger x. For vertical sides, use the y values. For example, $(-3, 1)$ to $(2, 1)$ is $2 - (-3) = 5$ units. Add every boundary side for perimeter.

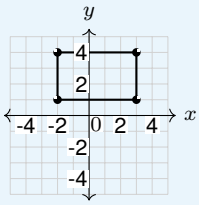
Worked example

Plot and connect the rectangle, then find perimeter. A$(-2, 1)$, B$(3, 1)$, C$(3, 4)$, D$(-2, 4)$.

1. Horizontal side $= |3 - (-2)| = 5$; vertical side $= |4 - (1)| = 3$.

2. Opposite sides match, so perimeter $= 5 + 3 + 5 + 3 = 16$ units.

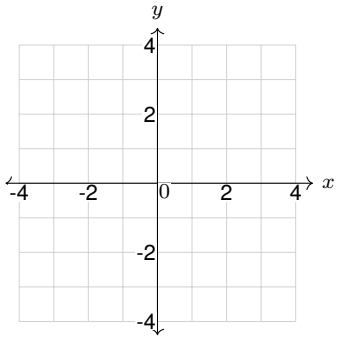
Answer: ABCD is a rectangle; side lengths $5, 3$; perimeter 16 units.



Practice Problems

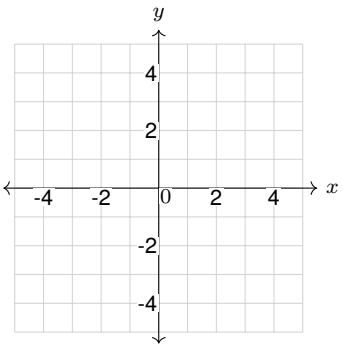
Show your thinking.

1. A garden has an L-shaped boundary. Plot and connect $(-3, -2)$, $(3, -2)$, $(3, 0)$, $(0, 0)$, $(0, 3)$, $(-3, 3)$ in order, closing the polygon. Find its perimeter. Then leave a 2-unit gate and find fencing length.



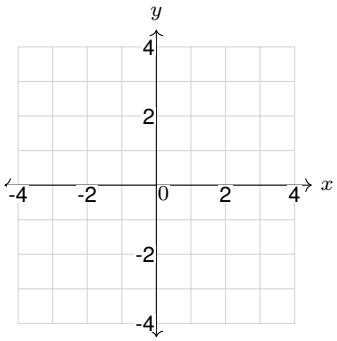
2. A rectangular playground has three corners below. Find the missing upper-left corner and the fencing length. A$(-3, 1)$, B$(1, 1)$, C$(1, 4)$.

3. A triangular banner needs labels for its two perpendicular edges. Plot and connect A$(0, -3)$, B$(4, -3)$, C$(4, 1)$. Identify the perpendicular sides and their lengths; do not find the diagonal length.

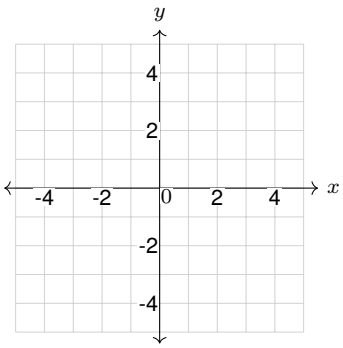


4. A square garden stretches from $x = -2$ to 3 and from $y = -2$ to 3. One unit represents 2 m. How much fencing is needed if the gate is 3 m wide?

5. Design an axis-aligned rectangle with A$(-3, -2)$, B$(3, -2)$ and perimeter 20 units. Put the other corners above AB. Find those corners and plot all four.



6. A plan omits one side in its perimeter. Draw the closed boundary and compute all four sides. A$(1, -4)$, B$(4, -4)$, C$(4, -1)$, D$(1, -1)$.



Answer Key

1. Perimeter 22 units. Fencing 20 units.
2. D$(-3, 4)$; perimeter 14 units.
3. AB and BC are perpendicular; AB 4 units, BC 4 units.
4. 37 m of fencing.
5. C$(3, 2)$ and D$(-3, 2)$; height 4 units.
6. ABCD is a rectangle; side lengths $3, 3$; perimeter 12 units.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The first horizontal/vertical lengths are $|3 - (-3)| = 6$ and $|0 - (-2)| = 2$.

2. In boundary order, side lengths are $6, 2, 3, 3, 3, 5$; total $= 6 + 2 + 3 + 3 + 3 + 5 = 22$ units.

3. Fencing excludes the gate: $22 - 2 = 20$ units.

Problem 2

1. D shares A's horizontal coordinate -3 and C's vertical coordinate 4, so D$(-3, 4)$.

2. Width $= 1 - (-3) = 4$, height $= 4 - (1) = 3$.

3. Perimeter $= 2(4 + 3) = 14$ units.

Problem 3

1. A and B share $y = -3$, so AB is horizontal with length $|4 - (0)| = 4$.

2. B and C share $x = 4$, so BC is vertical with length $|1 - (-3)| = 4$.

3. A horizontal line and a vertical line meet at a 90° angle, so the triangle has a right angle at B.

Problem 4

1. Each side is $3 - (-2) = 5$ units, or $5(2) = 10$ m.

2. The boundary is $4(10) = 40$ m. Subtract the gate: $40 - 3 = 37$ m.

Problem 5

1. Width $= 3 - (-3) = 6$; half-perimeter $= 20/2 = 10$, so height $= 10 - 6 = 4$.

2. Top coordinate $= -2 + 4 = 2$, so C$(3, 2)$ and D$(-3, 2)$. Check $2(6 + 4) = 20$.

Problem 6

1. Horizontal side $= |4 - (1)| = 3$; vertical side $= | - 1 - (-4)| = 3$.

2. Opposite sides match, so perimeter $= 3 + 3 + 3 + 3 = 12$ units.

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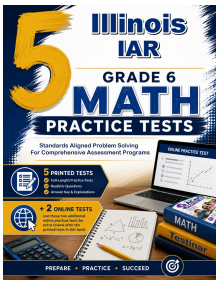

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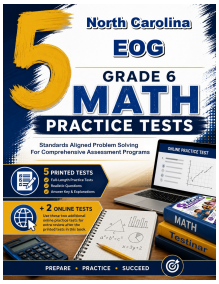

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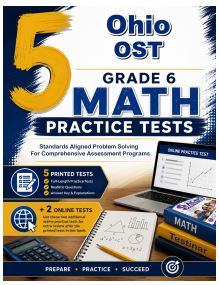

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