Graphing and Interpreting Points

Graphing and Interpreting Points: Apply, Compare, and Design

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

Plot (x, y) by going right x units and up y units. A shared x makes a vertical segment; a shared y makes a horizontal segment. Count intervals or subtract the coordinates that change.

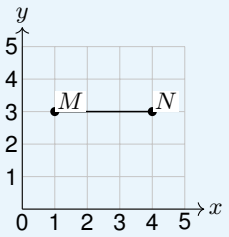
Worked example

How long is the segment from $M(1, 3)$ to $N(4, 3)$? Is it horizontal or vertical?

1. Both points have $y = 3$, so connect them along the same row.

2. The gap is $4 - 1 = 3$ unit intervals.

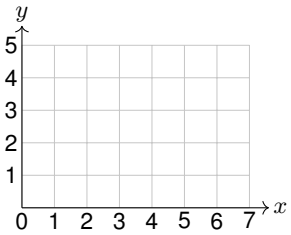
Answer: Horizontal, 3 units long.



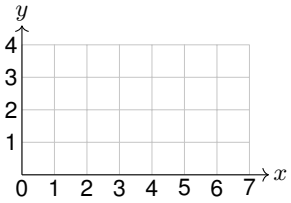
Practice Problems

Show your thinking.

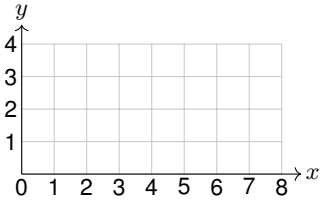
1. A mural starts at $A(1, 1)$ and takes four steps: right 3, up 2, right 2, up 1. Plot and connect the start and the end of each step. Give the final location.



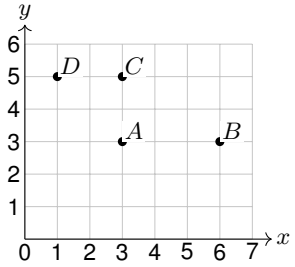
2. Three lamps must be in row $y = 2$, with the center lamp at $x = 4$ and each neighbor exactly 2 units from it. Plot all three and give their ordered pairs.



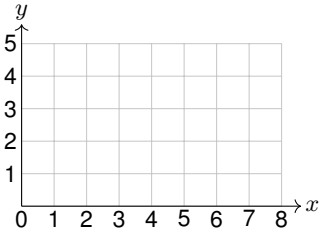
3. A rectangular banner has lower-left corner $(2, 1)$ and sides along grid lines. Its area must be 10 square units. It may extend no farther right than $x = 7$ or up than $y = 3$. Find and draw its four corners.



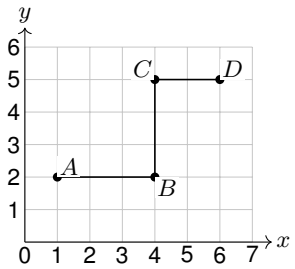
4. Only horizontal and vertical corridors are allowed. Which marked destination cannot be connected to A by one straight corridor? Use both coordinates to explain.



5. A triangle has vertices $(1, 1), (1, 4), (3, 1)$. Slide each vertex 4 units right and keep its height. Plot and join the new vertices. What happens to the lengths of the two axis-aligned sides?



6. A test cart follows the plotted route A to B to C to D. Its safe region is $y \leq 4$. On which segment does it first leave the region? Give the last point on the boundary before it leaves.



Answer Key

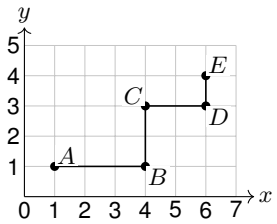
1. Final location $(6, 4)$.
2. $(2, 2), (4, 2), (6, 2)$.
3. $(2, 1), (7, 1), (7, 3), (2, 3)$.
4. D needs a turn.
5. New vertices $(5, 1), (5, 4), (7, 1)$. The two sides stay 3 and 2 units long.
6. On BC; last safe point $(4, 4)$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

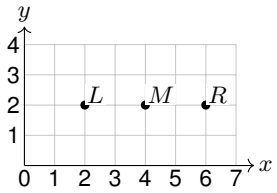
Problem 1

1. The first two turns end at $(1 + 3, 1) = (4, 1)$ and $(4, 1 + 2) = (4, 3)$.
2. Then go to $(4 + 2, 3) = (6, 3)$ and $(6, 3 + 1) = (6, 4)$. Draw each segment in order.



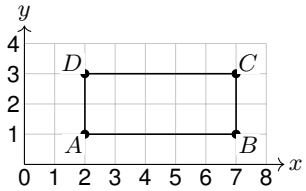
Problem 2

1. Use $4 - 2 = 2$ for the left lamp and $4 + 2 = 6$ for the right lamp.
2. Keep the height 2 for all three. The columns $2, 4, 6$ have two-unit gaps.



Problem 3

1. The largest possible width is $7 - 2 = 5$ and largest height is $3 - 1 = 2$.
2. Their product is $5 \times 2 = 10$ square units. Any shorter side would reduce the area, so use both limits and close the boundary.

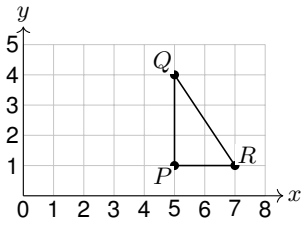


Problem 4

1. $A(3, 3)$ shares row 3 with $B(6, 3)$ and column 3 with $C(3, 5)$.
2. $D(1, 5)$ has $x = 1 \neq 3$ and $y = 5 \neq 3$. A single horizontal or vertical corridor cannot connect it to A.

Problem 5

1. Add 4 to each first coordinate: $1 + 4 = 5$ and $3 + 4 = 7$. Keep the heights $1, 4, 1$.
2. The vertical gap is still $4 - 1 = 3$ and the horizontal gap is $7 - 5 = 2$, the same as $3 - 1 = 2$ before.



Problem 6

1. AB stays at height 2, below the limit of 4.
2. BC stays in column 4 and rises from height 2 to 5. It crosses the limit at $(4, 4)$ before going higher.

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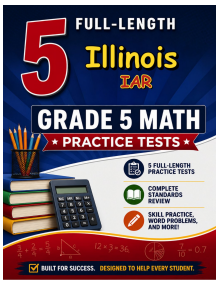

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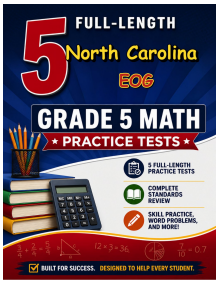

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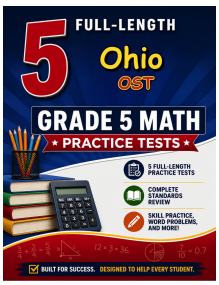

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