Solving Problems on the Coordinate Plane

Solving Problems on the Coordinate Plane: Find, Fix, and Work Backward

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QUICK REVIEW

For a horizontal leg, subtract the x-coordinates. For a vertical leg, subtract the y-coordinates. Add the lengths of all the legs, not just the last one. Use the map scale to convert grid units.

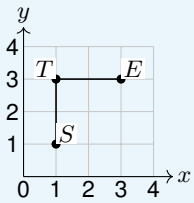
Worked example

A toy track goes from $(1, 1)$ up to $(1, 3)$, then right to $(3, 3)$. Each grid unit is 2 m. Find the track length.

1. Up: $3 - 1 = 2$ units. Right: $3 - 1 = 2$ units. The track is $2 + 2 = 4$ units.

2. At 2 m per unit, the length is $4 \times 2 = 8$ m.

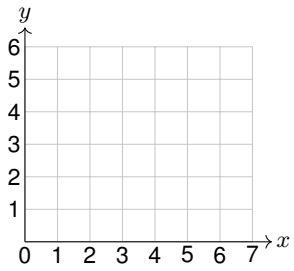
Answer: 8 m.



Practice Problems

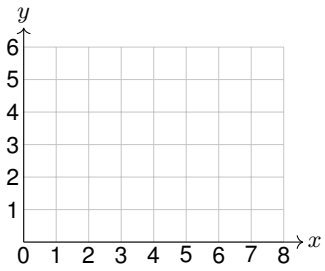
Show your thinking.

1. A route from $(1, 2)$ goes right an unknown number of units, then up 3 units to $(6, 5)$. Find the length of the first leg and plot the route.



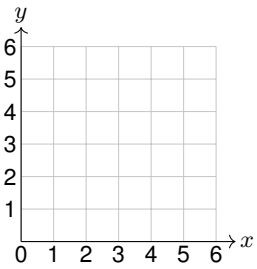
2. A robot ends at $(7, 6)$ after moving 3 units right, then 4 up. Find where it started and check by repeating the moves.

3. An axis-aligned rectangle has consecutive corners $A(2, 2), B(7, 2), C(7, 5)$. Find D, plot the entire boundary, and find its perimeter.

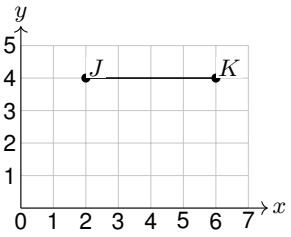


4. A map has a straight path from $(4, 2)$ to $(4, 7)$. One grid unit is 2 m. A student adds $7 + 2$ to count grid units. Correct the count and find the distance in meters.

5. Two routes run from $(1, 1)$ to $(5, 4)$. A goes right, then up. B goes up to $(1, 5)$, right to $(5, 5)$, then down. Plot both and compare their lengths.



6. A bus follows the marked street. A rider counts five grid intersections, including the endpoints, and says the ride is five blocks. One interval is one block. Is the rider right?



Answer Key

1. The first leg is 5 units.
2. Start $(4, 2)$.
3. $D(2, 5)$; perimeter 16 units.
4. 5 grid units, or 10 m.
5. A: 7 units; B: 9 units. B is 2 units longer.
6. No. The ride is 4 blocks.

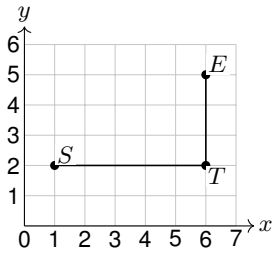
Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The up leg keeps $x = 6$, so the turn is at $(6, 2)$.

2. The first leg measures $6 - 1 = 5$ units. The second measures $5 - 2 = 3$ units, as required.



Problem 2

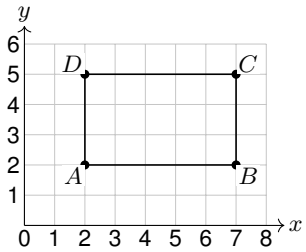
1. Undo the right and up moves: $7 - 3 = 4$ and $6 - 4 = 2$.

2. Check by moving from $(4, 2)$ to $(4 + 3, 2) = (7, 2)$, then $(7, 2 + 4) = (7, 6)$.

Problem 3

1. D shares $x = 2$ with A and $y = 5$ with C. Use $(2, 5)$ to close the rectangle.

2. The sides measure $7 - 2 = 5$ and $5 - 2 = 3$ units. Perimeter is $2 \times (5 + 3) = 16$ units.



Problem 4

1. The path stays in column 4. The height changes by $7 - 2 = 5$ grid units, not $7 + 2$.

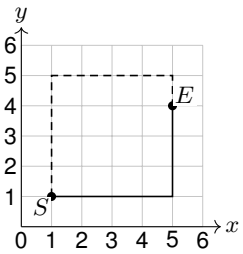
2. Multiply the count by the scale: $5 \times 2 = 10$ m.

Problem 5

1. Route A, solid: $5 - 1 = 4$ units right and $4 - 1 = 3$ up, totaling 7 units.

2. Route B, dashed: $5 - 1 = 4$ units up, $5 - 1 = 4$ right, and $5 - 4 = 1$ down. Total $4 + 4 + 1 = 9$ units.

3. B is longer by $9 - 7 = 2$ units.



Problem 6

1. The endpoints at $(2, 4)$ and $(6, 4)$ include 5 intersections along the row.

2. Distance counts the gaps between them. The gap count is $6 - 2 = 4$, so there are 4 blocks.

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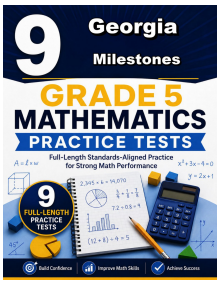

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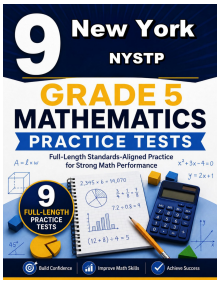

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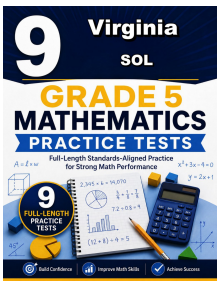

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