Finding Area on the Coordinate Plane

Area on the coordinate plane: Mistakes and missing information

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

QUICK REVIEW

Find lengths from coordinate differences, then use the matching area formula. A rectangle from $x = -2$ to 3 and $y = 1$ to 4 has width 5, height 3, area 15 square units. A right triangle with the same perpendicular base and height has half that area, 7.5. Count a gap across zero by adding distances.

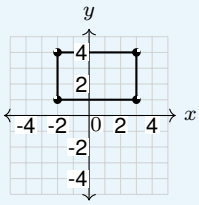
Worked example

Use coordinate differences. Plot and connect $(-2, 1)$, $(3, 1)$, $(3, 4)$, $(-2, 4)$ in order. Find the area.

1. Horizontal base $= 3 - (-2) = 5$ units; perpendicular height $= 4 - (1) = 3$ units.

2. Rectangle area $= 5 \times 3 = 15$ square units.

Answer: 15 square units.

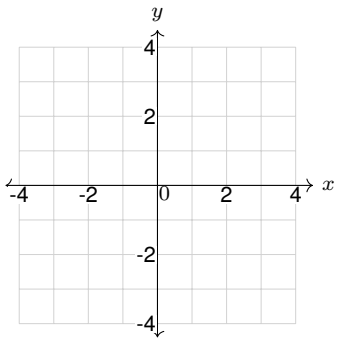


Practice Problems

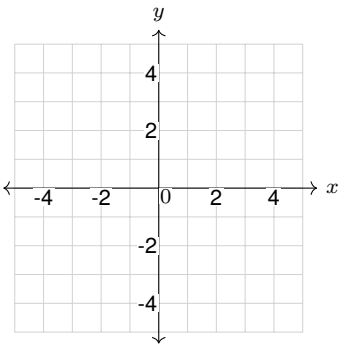
Show your thinking.

1. A student uses $2 - 4 = -2$ as width. Correct it. The vertices in order are $(-4, -1)$, $(2, -1)$, $(2, 2)$, $(-4, 2)$. Find the area using coordinate differences.

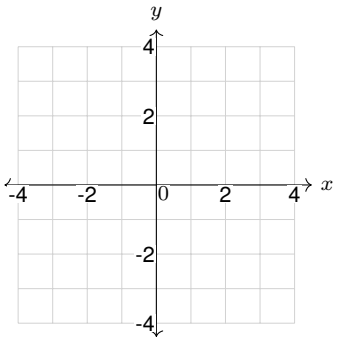
2. A student labels the triangle area 16. Correct it. Plot and connect $(-2, -3)$, $(2, -3)$, $(2, 1)$ in order. Find the area.



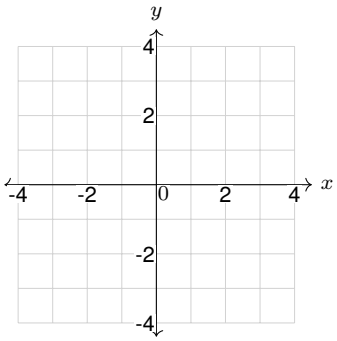
3. Recover width and height from these vertices. Plot and connect $(1, -2)$, $(4, -2)$, $(4, 3)$, $(1, 3)$ in order. Find the area.



4. A student uses a slanted side as height. Use the perpendicular sides. Plot and connect $(-3, 0)$, $(3, 0)$, $(3, 2)$ in order. Find the area.



5. An L-shape has vertices $(-3, -2)$, $(3, -2)$, $(3, 0)$, $(0, 0)$, $(0, 3)$, $(-3, 3)$. A student uses the whole bounding rectangle. Plot it and subtract the missing corner.



6. Explain why equal bounding rectangles do not give equal rectangle and triangle areas. The vertices in order are $(-2, 1)$, $(3, 1)$, $(3, 4)$. Find the area using coordinate differences.

Answer Key

1. 18 square units.
2. 8 square units.
3. 15 square units.
4. 6 square units.
5. 21 square units.
6. $\frac{15}{2}$ square units. The bounding rectangle has 15 square units, twice the triangle area.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Horizontal base $= 2 - (-4) = 6$ units; perpendicular height $= 2 - (-1) = 3$ units.
2. Rectangle area $= 6 \times 3 = 18$ square units.

Problem 2

1. Horizontal base $= 2 - (-2) = 4$ units; perpendicular height $= 1 - (-3) = 4$ units.
2. Triangle area $= 4 \times 4/2 = 8$ square units.

Problem 3

1. Horizontal base $= 4 - (1) = 3$ units; perpendicular height $= 3 - (-2) = 5$ units.
2. Rectangle area $= 3 \times 5 = 15$ square units.

Problem 4

1. Horizontal base $= 3 - (-3) = 6$ units; perpendicular height $= 2 - (0) = 2$ units.
2. Triangle area $= 6 \times 2/2 = 6$ square units.

Problem 5

1. Bounding rectangle: width 6, height 5, area $6 \times 5 = 30$.
2. Missing upper-right corner: width 3, height 3, area $3 \times 3 = 9$.
3. Actual area $= 30 - 9 = 21$ square units.

Problem 6

1. Horizontal base $= 3 - (-2) = 5$ units; perpendicular height $= 4 - (1) = 3$ units.
2. Triangle area $= 5 \times 3/2 = \frac{15}{2}$ square units.
3. The matching rectangle covers $5(3) = 15$ square units. The diagonal divides it into two equal triangles.

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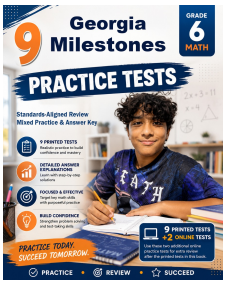

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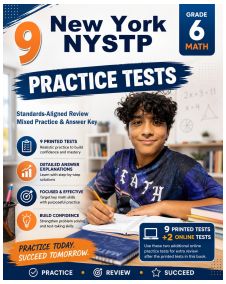

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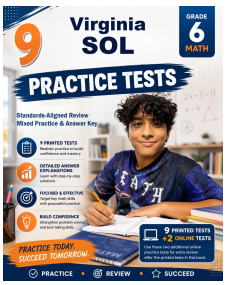

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