Perimeter and Area from Coordinates

Perimeter: distance for every side, then add. Rectangle area: length times width. Triangle area: one half base times height, with the height checked by slopes. Box method: box it and subtract the corners.

1 THE VOCABULARY
Words we use

Perimeter the distance around.

Area the flat space inside, in square units.

Altitude a segment from a vertex meeting the opposite side at a right angle: the height.

Vertex a corner.

Box method box the shape, subtract the corner triangles.

- Watch out for these.
- Using a slanted side as the height.
- Forgetting the one half for a triangle.
- Counting a slanted side instead of using the distance formula.
- Adding areas of the corner pieces instead of subtracting.

2 THE METHOD
Perimeter and area

1. PERIMETER distance for each side, add them.
2. RECTANGLE length times width, both by distance.
3. TRIANGLE: CHECK D on the base (same slope); altitude perpendicular (negative reciprocal).
4. TRIANGLE: AREA one half times base times height.
5. BOX METHOD box area minus the corner right triangles.

WHY THE HEIGHT MUST BE PERPENDICULAR
Area counts the space straight up from the base. A slanted segment is longer than that straight-up distance, so it would make the area too big.

3 THE TRIANGLE
A(–4, –2), B(8, 7), C(1, 8), D(4, 4)

slope AB = 34, slope AD = 34	D is on AB
slope CD = –43	the negative reciprocal: a right angle
AB = √225 = 15	the base
CD = √25 = 5	the height
12 × 15 × 5 = 37.5	square units

THE PENTAGON'S PERIMETER
5 + 5 + 5 + √37 + √34 ≈ 26.91.

SAY IT OUT LOUD
Perimeter: every side, then add. Triangle: one half base times height, and check the height with slopes.