

Areas in Coordinate Geometry:

Always:

- 1) Label the graph paper.
- 2) Include your formulas.
- 3) Show all work!!!

To find the area of a figure in the coordinate plane, we will have two methods that we can use:

1) Finding Area Using Coordinates:

If one side of a triangle or special quadrilateral is parallel to a coordinate axis, the area of the figure can be determined by drawing an altitude to that side and then using the appropriate formula.

The lengths of the segments can be found by counting the units.

Example:

Find the area of a triangle whose vertices are A(3,2), B(7,2), and C(6,5).

When a figure does not have any sides parallel to either axis, we use the following method:

2) Finding Area Indirectly:

When the area of a figure cannot be found directly, it may be possible to find the area indirectly.

Example:

Find the area of the quadrilateral whose vertices are A(-2,2), B(2,5), C(8,1), and D(-1,-2).

Hint: Circumscribe a rectangle (WXYZ) about quadrilateral ABCD by drawing intersecting horizontal and vertical segments through the vertices of the quadrilateral. Then, you can find the area by 1) finding the area of the rectangle, finding the sum of the areas of the right triangles in the four corners, and 3) subtracting the sum of the areas of the right triangles from the area of the rectangle.

Area of quadrilateral ABCD = (area of rectangle WXYZ) – (Area of triangle WAB + area of triangle BXC + area of triangle CDY + area of triangle AZD)

More Examples:

1) The vertices of triangle ABC are (-4,0), B(2,4), and C(4,0). What is the area in square units of triangle ABC?

2) The coordinates of the vertices of rectangle ABCD are A(2,2), B(2,6), C(8,6), and D(8,2). What is the area in square units of rectangle ABCD?

- 3) Find the area, in square units, of the triangle whose vertices are $A(0,5)$, $B(6,0)$, and $C(0,0)$.
- 4) Find the area, in square units, of the triangle whose vertices are $A(2,2)$, $B(2,7)$, and $C(5,2)$.
- 5) Find the area, in square units, of a parallelogram whose vertices are $A(2,1)$, $B(7,1)$, $C(9,5)$, and $D(4,5)$.
- 6) If the area of the triangle whose vertices are $A(1,4)$, $B(1,1)$, and $C(x,1)$ is 6 square units, what is the value of x ?
- 7) The rectangle whose vertices are $A(0,0)$, $B(0,5)$, $C(h,k)$, and $D(8,0)$ lies in Quadrant I. What are the value of h and k ? What is the area of rectangle $ABCD$?
- 8) Find the area of the trapezoid whose vertices are $T(-4,-4)$, $R(-1,5)$, $A(6,5)$, and $P(9,-4)$.
- 9) Find the area of the quadrilateral whose vertices are $A(-4,-2)$, $B(5,0)$, $C(9,3)$, and $D(7,-4)$.
- 10) Find the area of a triangle whose vertices are $A(-2,3)$, $B(1,5)$, and $C(4,2)$.