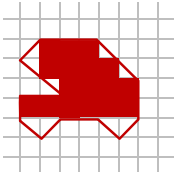


Lesson 9-4

Objective – To find the area of irregular shapes using a grid or coordinate system.



First: Count the full squares.

17 full squares.

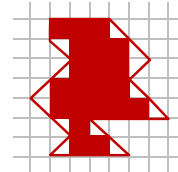
Second: Count the half squares.

9 half squares.

Third: Calculate the total number of full squares.

$$\text{Area} = \text{Full} + \frac{1}{2} \cdot \text{Half} = 17 + \frac{1}{2} \cdot 9 = 21.5 \text{ un}^2$$

Find the area of the irregular figure below.



First: Count the full squares.

21 full squares.

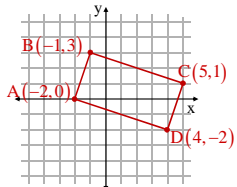
Second: Count the half squares.

13 half squares.

Third: Calculate the total number of full squares.

$$\text{Area} = \text{Full} + \frac{1}{2} \cdot \text{Half} = 21 + \frac{1}{2} \cdot 13 = 27.5 \text{ un}^2$$

Classify the polygon with vertices A(-2,0), B(-1,3), C(5,1), D(4,-2). Find its perimeter and area.



$$\text{Slope}_{AB} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3-0}{-1-2} = \frac{3}{-1} = -3$$

$$\text{Slope}_{CD} = \frac{-2-1}{4-5} = \frac{-3}{-1} = 3 \quad \overline{AB} \parallel \overline{CD}$$

$$\text{Slope}_{BC} = \frac{1-3}{5-1} = \frac{-2}{4} = -\frac{1}{2}$$

$$\text{Slope}_{AD} = \frac{-2-0}{4-2} = \frac{-2}{2} = -1$$

$\overline{AB} \perp \overline{BC} \therefore ABCD$ is a rectangle.

Perimeter

$$AB = \sqrt{(-1-2)^2 + (3-0)^2}$$

$$AB = \sqrt{(1)^2 + (3)^2} = \sqrt{10}$$

$$BC = \sqrt{(5-1)^2 + (1-3)^2}$$

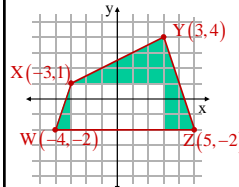
$$BC = \sqrt{(4)^2 + (-2)^2} = \sqrt{20} = 2\sqrt{10}$$

$$P = 2L + 2W \quad A = L \cdot W$$

$$P = 2(\sqrt{10}) + 2(\sqrt{10}) \quad A = 2\sqrt{10} \cdot \sqrt{10}$$

$$P = 4\sqrt{10} \text{ un.} \quad A = 20 \text{ un}^2$$

Classify the polygon with vertices W(-4,-2), X(-3,1), Y(3,4), Z(5,-2). Find its perimeter and area.



WXYZ is a quadrilateral.

Perimeter

$$WX = \sqrt{(-3-4)^2 + (1-2)^2}$$

$$WX = \sqrt{(1)^2 + (-1)^2} = \sqrt{2}$$

$$XY = \sqrt{(3-3)^2 + (4-1)^2}$$

$$XY = \sqrt{(0)^2 + (3)^2} = 3$$

$$YZ = \sqrt{(5-3)^2 + (-2-4)^2}$$

$$YZ = \sqrt{(2)^2 + (-6)^2} = \sqrt{40} = 2\sqrt{10}$$

$$WZ = 9$$

$$P = \sqrt{2} + 3 + 2\sqrt{10} + 9$$

$$P = 9 + \sqrt{2} + 3 + 2\sqrt{10} \text{ un.}$$

Area

$$A = \frac{1}{2} b \cdot h = 0.5(1 \cdot 3) = 1.5$$

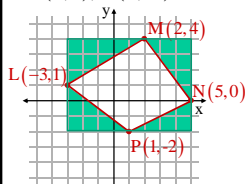
$$+ 0.5(2 \cdot 6) = 6$$

$$+ 0.5(6 \cdot 3) = 9$$

$$A = L \cdot W = 6(3) = 18$$

$$\text{Total Area} = 34.5 \text{ un}^2$$

Classify the polygon with vertices L(-3,1), M(2,4), N(5,0), P(1,-2). Find its perimeter and area.



LMNP is a quadrilateral.

Perimeter

$$LM = \sqrt{(2-3)^2 + (4-1)^2}$$

$$LM = \sqrt{(1)^2 + (3)^2} = \sqrt{10}$$

$$MN = \sqrt{(5-2)^2 + (0-4)^2}$$

$$MN = \sqrt{(3)^2 + (-4)^2} = \sqrt{25} = 5$$

$$NP = \sqrt{(5-1)^2 + (0-2)^2}$$

$$NP = \sqrt{(4)^2 + (-2)^2} = \sqrt{20} = 2\sqrt{5}$$

$$LP = \sqrt{(1-3)^2 + (-2-1)^2}$$

$$LP = \sqrt{(2)^2 + (-3)^2} = \sqrt{13}$$

$$A = L \cdot W = 8(6) = 48$$

$$-\frac{1}{2}(b \cdot h) = -0.5(4 \cdot 3) = -6$$

$$-0.5(5 \cdot 3) = -7.5$$

$$-0.5(3 \cdot 4) = -6$$

$$-0.5(4 \cdot 2) = -4$$

$$\text{Total Area} = 24.5 \text{ un}^2$$

$$P = \sqrt{10} + 5 + 2\sqrt{5} + \sqrt{13}$$