Section Overview

Formulas in Geometry

Why? Finding area and perimeter of figures is an important skill in a variety of occupations.

$P = 2\ell + 2w$
$A = \ell w$

$P = a + b + c$
$A = \dfrac{1}{2}bh$

$C = 2\pi r$
$A = \pi r^2$

$P = 4s$
$A = s^2$

Midpoint and Distance

Why? Some problems are easier to solve when the figure is drawn on a coordinate plane.

Midpoint Formula
The midpoint of $A(x_1, y_1)$ and $B(x_2, y_2)$ is

$$M\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right).$$

Distance Formula
The distance between $A(x_1, y_1)$ and $B(x_2, y_2)$ is

$$AB = \sqrt{(x_2 - x_1) + (y_2 - y_1)}.$$

Given $A(2, 7)$ and $B(-4, 1)$, the midpoint is

$$M\left(\dfrac{2 + (-4)}{2}, \dfrac{7 + 1}{2}\right) = \left(\dfrac{-2}{2}, \dfrac{8}{2}\right) = (-1, 4).$$

Given $A(2, 7)$ and $B(-4, 1)$, the distance is

$$AB = \sqrt{(-4 - 2)^2 + (1 - 7)^2} = \sqrt{36 + 36} = \sqrt{72} \approx 8.5.$$

Transformations

Why? Patterns are formed by translating, reflecting, and rotating figures.

Reflection

Each point and its image are the same distance from the line of reflection.

Rotation

Each point and its image are the same distance from the center of rotation P.

Translation

All points of a figure move the same distance in the same direction.