8.5 Applications of Matrices and Determinants

You will learn to

· Use Cramer's rule to solve a system by determinants.
· Determine the area of a triangle given three vertices on the coordinate plane.
· Write an equation of a line given two points.

Cramer's Rule

If $ax + by = c$ then x =   y=
    $dx + ey = f$

We can rewrite this as Cramer's rule:

$$x = \frac{D_x}{D} \qquad\qquad y = \frac{D_y}{D}$$

Example 1 Use Cramer's rule to solve this :

$$5x - 2y = 3$$
$$6x + 4y = -8$$

Cramer's rule can be used to solve a 3 x 3 system as well.

Example 2:

Set up the determinants for this system:

D =

$$-y + 2z = 3$$
$$4x + y \quad = 5$$
$$x \quad -2z = -6$$

$D_x =$

$D_y =$

$D_z =$

Area of a triangle with vertices (x_1, y_1) , (x_2, y_2) , (x_3, y_3)

Test for collinearity

Example 2: Determine if these three points are collinear. If not, then find the area of the triangle which has them as the three vertices.

A (-3,4)   B (2,0)   C (5, -1)

Two point form of the equation of a line.

An equation of a line through the points (x_1, y_1) and (x_2, y_2) can be found using determinants.

Example 3: Write an equation of the line through the points (1, 5) and (0, -2)