
Mr. Jones lives 50 miles away from you. You both leave home at 5:00 and drive toward each other.
Mr. Jones travels at 35 mph., and you drive at 40 mph. At what time will you pass Mr. Jones on the road?
GIVEN THE TRAFFIC AROUND HERE at 5:00, WHO KNOWS?
I ALWAYS CATCH THESE TRICK QUESTIONS.

10.4-10.5 Applications of Matrices and Determinants

Let's look at:

$b_2(a_1x + b_1y = c_1)$

$b_1(a_2x + b_2y = c_2)$

$x = \frac{c_1b_2 - c_2b_1}{a_1b_2 - a_2b_1}$

solve for x

$$a_1b_2x + b_1b_2y = c_1b_2$$

$$-\left(a_2b_1x + b_1b_2y = c_2b_1\right)$$

$$a_1b_2x - a_2b_1x = c_1b_2 - c_2b_1$$

$$x(a_1b_2 - a_2b_1) = c_1b_2 - c_2b_1$$

Let's look at:

$$a_1x + b_1y = c_1$$

$$a_2x + b_2y = c_2$$

solve for y

$$y = \frac{a_2b_1 - b_2c_1}{a_1b_2 - a_2b_1}$$

Cramer's Rule

$$x = \frac{\begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}} \qquad y = \frac{\begin{vmatrix} a_1 & c_1 \\ a_2 & c_2 \end{vmatrix}}{\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}}$$

Use Cramer's Rule to solve:

$$4x - 2y = 10$$
$$3x - 5y = 11$$

$(2, -1)$

$$x = \frac{\begin{vmatrix} 10 & -2 \\ 11 & -5 \end{vmatrix}}{\begin{vmatrix} 4 & -2 \\ 3 & -5 \end{vmatrix}} = \frac{-28}{-14} \qquad y = \frac{\begin{vmatrix} 4 & 10 \\ 3 & 11 \end{vmatrix}}{\begin{vmatrix} 4 & -2 \\ 3 & -5 \end{vmatrix}} = \frac{14}{-14}$$

Use Cramer's Rule to solve:

$$-7x + 11y = -1$$
$$3x - 9y = 9$$

$$2x + y - 3z = 15$$
$$4x - y + 2z = -9$$
$$-2x + 2y + z = 6$$

$$x = \frac{\begin{vmatrix} 15 & 1 & -3 \\ -9 & -1 & 2 \\ 6 & 2 & 1 \end{vmatrix}}{\begin{vmatrix} 2 & 1 & -3 \\ 4 & -1 & 2 \\ -2 & 2 & 1 \end{vmatrix}}$$

$$y = \frac{\begin{vmatrix} 2 & 15 & -3 \\ 4 & -9 & 2 \\ -2 & 6 & 1 \end{vmatrix}}{\begin{vmatrix} 2 & 1 & -3 \\ 4 & -1 & 2 \\ -2 & 2 & 1 \end{vmatrix}}$$

→ same

$$z = \frac{\begin{vmatrix} 2 & 1 & 15 \\ 4 & -1 & -9 \\ -2 & 2 & 6 \end{vmatrix}}{\begin{vmatrix} 2 & 1 & -3 \\ 4 & -1 & 2 \\ -2 & 2 & 1 \end{vmatrix}}$$

→ same

Area of a Triangle:

The area of a triangle with vertices (x_1, y_1), (x_2, y_2), and (x_3, y_3) is:

$$\text{Area} = \pm \frac{1}{2} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

Find the area of a triangle whose vertices are:
(1,0), (2,2), (4,3)

Cryptography: a cryptogram is a message written according to a secret code.

MEET ME MONDAY

[13 5 5][20 0 13][5 0 13][15 14 4][1 25 0

$$\begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & -4 \end{bmatrix}$$