

Warm Up

Which of the following is the inverse of the matrix $\begin{pmatrix} 4 & -3 \\ 2 & -2 \end{pmatrix}$?

[A] $\begin{pmatrix} -1 & 3 \\ -1 & 2 \end{pmatrix}$

[B] $\begin{pmatrix} 2 & -1 \\ 3 & -1 \end{pmatrix}$

[C] $\begin{pmatrix} 1 & -\frac{3}{2} \\ 1 & -2 \end{pmatrix}$

[D] $\begin{pmatrix} \frac{1}{7} & -\frac{3}{14} \\ \frac{1}{7} & -\frac{2}{7} \end{pmatrix}$

$$\begin{aligned} \text{Det} &= (4)(-2) - (-3)(2) \\ &= -8 - -6 \\ &= -2 \end{aligned}$$

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

Which system of equations would you use to represent the cost of these two newspaper classified rates?

- The "Daily Gleaner" has a flat rate of \$18 plus 20¢ per word
- The "Times-Transcript" has a flat rate of \$25 plus 10¢ per word

(A) $C - 18 = 20w$
 $C - 25 = 10w$

(B) $18 + C = 20w$
 $25 + C = 10w$

(C) $C = 0.2w + 18$
 $C = 0.1w + 25$

(D) $C - 18w = 0.2$
 $C - 25w = 0.1$

BONUS!!

Determine a, b, and c so that the points $(-1, 5)$, $(2, -1)$, and $(3, 13)$ are on the graph of $f(x) = ax^2 + bx + c$.

$$y = ax^2 + bx + c$$

$$\begin{matrix} x & y \\ (-1, 5) \end{matrix}$$

$$5 = a(-1)^2 + b(-1) + c$$

$$\boxed{5 = a - b + c}$$

$$\begin{matrix} x & y \\ (2, -1) \end{matrix}$$

$$-1 = a(2)^2 + b(2) + c$$

$$\boxed{-1 = 4a + 2b + c}$$

$$\begin{matrix} x & y \\ (3, 13) \end{matrix}$$

$$13 = a(3)^2 + b(3) + c$$

$$\boxed{13 = 9a + 3b + c}$$

$$a - b + c = 5$$

$$4a + 2b + c = -1$$

$$9a + 3b + c = 13$$

$$\left[\begin{array}{ccc|c} 1 & -1 & 1 & 5 \\ 4 & 2 & 1 & -1 \\ 9 & 3 & 1 & 13 \end{array} \right]$$

3x4

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rref([A])
[ 1  0  0  4  1
  0  1  0 -6]
[ 0  0  1 -5]
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$$a = 4$$

$$b = -6$$

$$c = 5$$

Questions from Homework

⑤ b) $2x - 3y + z = -9$
 $2x - 4y + 3z = -16$
 $4x + y - 3z = 13$

$$\left[\begin{array}{ccc|c} 2 & -3 & 1 & -9 \\ 2 & -4 & 3 & -16 \\ 4 & 1 & -3 & 13 \end{array} \right] \begin{array}{l} R_2 - R_1 \\ R_3 - 2R_1 \end{array} \left[\begin{array}{ccc|c} 2 & -3 & 1 & -9 \\ 0 & -1 & 2 & -7 \\ 0 & 7 & -5 & 31 \end{array} \right] \begin{array}{l} R_3 + 7R_2 \end{array} \left[\begin{array}{ccc|c} 2 & -3 & 1 & -9 \\ 0 & -1 & 2 & -7 \\ 0 & 0 & 9 & -18 \end{array} \right]$$

$9z = -18$
 $z = -2$

$-y + 2z = -7$
 $-y + 2(-2) = -7$
 $-y - 4 = -7$
 $-y = -3$
 $y = 3$

$2x - 3y + z = -9$
 $2x - 3(3) + (-2) = -9$
 $2x - 9 - 2 = -9$
 $2x - 11 = -9$
 $2x = 2$
 $x = 1$

$(1, -2, 3)$

④ b) $\left[\begin{array}{cc|cc} 12 & 10 & 1 & 0 \\ 7 & 6 & 0 & 1 \end{array} \right] \begin{array}{l} 3R_1 - 5R_2 \\ 12R_2 - 7R_1 \end{array}$

$$\left[\begin{array}{cc|cc} 1 & 0 & 3 & -5 \\ 0 & 2 & -7 & 12 \end{array} \right] R_2 \div 2$$

$$\left[\begin{array}{cc|cc} 1 & 0 & 3 & -5 \\ 0 & 1 & -7/2 & 6 \end{array} \right] \leftarrow \text{Inverse}$$

Questions from Homework

⑤ c) $3x - 2y + 5z = 1$
 $4x + 5y - 3z = 17$
 $7x - 3y + 2z = 36$

$$\left[\begin{array}{ccc|c} 3 & -2 & 5 & 1 \\ 4 & 5 & -3 & 17 \\ 7 & -3 & 2 & 36 \end{array} \right] \begin{array}{l} 3R_2 - 4R_1 \\ 3R_3 - 7R_1 \end{array} \rightarrow \left[\begin{array}{ccc|c} 3 & -2 & 5 & 1 \\ 0 & 23 & -29 & 47 \\ 0 & 5 & -29 & 101 \end{array} \right] \begin{array}{l} \\ 23R_3 - 5R_2 \end{array}$$

$$-522z = 2088$$

$$z = -4$$

$$23y - 29z = 47$$

$$23y - 29(-4) = 47$$

$$23y + 116 = 47$$

$$23y = -69$$

$$y = -3$$

$$3x - 2y + 5z = 1$$

$$3x - 2(-3) + 5(-4) = 1$$

$$3x + 6 - 20 = 1$$

$$3x - 14 = 1$$

$$3x = 15$$

$$x = 5$$

$$\underline{\underline{(5, -3, -4)}}$$

Review Sheet

$$\textcircled{1} \begin{bmatrix} 2x+y & 5 \\ -1 & y-x \end{bmatrix} = \begin{bmatrix} -2 & 5 \\ -1 & 1 \end{bmatrix}$$

$$\begin{array}{l} 2x+y = -2 \\ y-x = 1 \end{array} \quad \rightarrow \quad \begin{array}{l} 2x+y = -2 \\ -x+y = 1 \\ \hline 3x = -3 \\ \boxed{x = -1} \end{array} \quad \rightarrow \quad \begin{array}{l} 2x+y = -2 \\ 2(-1)+y = -2 \\ -2+y = -2 \\ \boxed{y = 0} \end{array}$$