

Bellringer - Algebra 2 with Trig    October 11, 2016

A car averages 27 miles per gallon. If gas costs \$4.04 per gallon, which of the following is closest to how much the gas would cost for this car to travel 2,727 typical miles?

- A.  \$44.44
- B.  \$109.08
- C.  \$118.80
- D.  \$408.04
- E.  \$444.40

$$\frac{2727}{27} = 101 @ 4.04 =$$

When  $x = 3$  and  $y = 5$ , by how much does the value of  $3x^2 - 2y$  exceed the value of  $2x^2 - 3y$ ?

F.  4

G.  14

H.  16

I.  20

J.  50

$$\begin{array}{r} 3(\cancel{3})^2 - 2(5) \\ 27 - 10 \\ 17 \end{array}$$

$$\begin{array}{r} 2(\cancel{3})^2 - 3(5) \\ 18 - 15 \\ 3 \end{array}$$

$$\textcircled{13} \begin{cases} x + y + z = 4 \\ 4x + 5y + 0z = 3 \\ 0x + y - 3z = -10 \end{cases}$$

$$\begin{bmatrix} 1 & 1 & 1 \\ 4 & 5 & 0 \\ 0 & 1 & -3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 4 \\ 3 \\ -10 \end{bmatrix}$$

$$\begin{aligned} 3x &= 60 \\ x &= 3 \cdot 60 \end{aligned}$$

$(2, -1, 3)$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 & 1 & 1 \\ 4 & 5 & 0 \\ 0 & 1 & -3 \end{bmatrix} \begin{bmatrix} 4 \\ 3 \\ -10 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ 3 \end{bmatrix}$$

$$\textcircled{14} \quad \begin{bmatrix} 0 & 9 & 2 \\ 3 & 2 & 1 \\ 1 & -1 & 0 \end{bmatrix}^{-1} \begin{bmatrix} 18 \\ 5 \\ -1 \end{bmatrix} = \begin{bmatrix} -3 \\ -2 \\ 18 \end{bmatrix}$$

$$\begin{cases} x + y + z = 9 \\ 2.45x + 1.85y + .80z = 15.00 \\ \cancel{2z = x + y} \\ x + y - 2z = 0 \end{cases}$$

$$\begin{bmatrix} 1 & 1 & 1 \\ 2.45 & 1.85 & .85 \\ 1 & 1 & -2 \end{bmatrix} \begin{bmatrix} 9 \\ 15 \\ 0 \end{bmatrix}$$

## Determinants

Only square matrices have determinants.

For a  $2 \times 2$

$$\begin{vmatrix} a & b \\ c & d \end{vmatrix} = \det: ad - bc$$

ex.

$$\begin{vmatrix} 2 & 9 \\ 6 & 1 \end{vmatrix} = 2 - 54 = -52$$

3x3

$$\begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 3 \\ 0 & -1 & 4 \end{bmatrix}$$

$$\begin{array}{cccccc} 1 & 0 & 2 & 1 & 0 \\ 2 & 1 & 3 & 2 & 1 \\ 0 & -1 & 4 & 0 & -1 \end{array} = (4+0-1) - (0-3+0)$$

$$= 0-3$$

$$= 3$$

Augmented Matrix

$$\begin{cases} 2x + 5y = 10 \\ 3x - y = 6 \end{cases} \leftarrow \text{System of equations}$$

$$\begin{bmatrix} 2 & 5 \\ 3 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 10 \\ 6 \end{bmatrix} \leftarrow \text{Matrix equation}$$

$$\left[ \begin{array}{cc|c} 2 & 5 & 10 \\ 3 & -1 & 6 \end{array} \right] \leftarrow \text{Augmented Matrix}$$