Topic: Representing systems with matrices

Question: Represent the system with an augmented matrix called B.

$$4x + 2y = 8$$

$$-2x + 7y = 11$$

Answer choices:

A $\quad B = \begin{bmatrix} 8 & 2 & 4 \\ 11 & -2 & 7 \end{bmatrix}$

B $\quad B = \begin{bmatrix} 4 & 2 & 8 \\ 7 & -2 & 11 \end{bmatrix}$

C $\quad B = \begin{bmatrix} 2 & 4 & 8 \\ -2 & 7 & 11 \end{bmatrix}$

D $\quad B = \begin{bmatrix} 4 & 2 & 8 \\ -2 & 7 & 11 \end{bmatrix}$

Solution: D

As you're building out an augmented matrix, you want to be sure that you have all the variables in the same order, and all your constants grouped together on the same side of the equation. That way, with everything lined up, it'll be easy to make sure that each entry in a column represents the same variable or constant, and that each row in the matrix captures the entire equation.

This problem is straightforward because the system is set up correctly with all variables in both equations.

$$4x + 2y = 8$$

$$-2x + 7y = 11$$

The system contains the variables x and y along with a constant. Which means the augmented matrix will have two columns, one for each variable, plus a column for the constants, so three columns in total. Because there are two equations in the system, the matrix will have two rows.

Plugging the coefficients and constants into an augmented matrix gives

$$B = \begin{bmatrix} 4 & 2 & 8 \\ -2 & 7 & 11 \end{bmatrix}$$

Topic: Representing systems with matrices

Question: Represent the system with an augmented matrix called G.

$$a - 3b + 9c + 6d = 4$$

$$8a + 6c = 9d + 15$$

Answer choices:

A $G = \begin{bmatrix} 1 & -3 & 9 & 6 & 4 \\ 8 & 0 & 6 & -9 & 15 \end{bmatrix}$

B $G = \begin{bmatrix} 1 & 9 & 6 & 4 \\ 8 & 6 & -9 & 15 \end{bmatrix}$

C $G = \begin{bmatrix} 1 & 3 & 9 & 6 & 4 \\ 8 & 0 & 6 & 9 & 15 \end{bmatrix}$

D $G = \begin{bmatrix} 1 & -3 & 9 & 6 & 4 \\ 15 & 6 & 0 & 5 & 8 \end{bmatrix}$

Solution: A

As you're building out an augmented matrix, you want to be sure that you have all the variables in the same order, and all your constants grouped together on the same side of the equation. That way, with everything lined up, it'll be easy to make sure that each entry in a column represents the same variable or constant, and that each row in the matrix captures the entire equation.

To do this, the second equation can be reorganized by putting a, c, and d on the left side, and the constant on the right side. We also recognize that there is no b-term in the second equation, so we add in a 0 "filler" term.

$$a - 3b + 9c + 6d = 4$$

$$8a + 0b + 6c - 9d = 15$$

The system contains the variables a, b, c, and d, along with a constant. Which means the augmented matrix will have four columns, one for each variable, plus a column for the constants, so five columns in total. Because there are two equations in the system, the matrix will have two rows.

Plugging the coefficients and constants into an augmented matrix gives

$$G = \begin{bmatrix} 1 & -3 & 9 & 6 & 4 \\ 8 & 0 & 6 & -9 & 15 \end{bmatrix}$$

Topic: Representing systems with matrices

Question: Represent the system with an augmented matrix called N.

$$6a + 4b - c = 9$$

$$5b = -6a + 7c - 6$$

$$3c = 14 - 2a$$

Answer choices:

A $N = \begin{bmatrix} 6 & 4 & -1 & 9 \\ 5 & -6 & 7 & -6 \\ 3 & 14 & -2 & 0 \end{bmatrix}$

B $N = \begin{bmatrix} 6 & 4 & -1 & 9 \\ -6 & 5 & 7 & -6 \\ -2 & 3 & -14 & 0 \end{bmatrix}$

C $N = \begin{bmatrix} 6 & 4 & -1 & 9 \\ 6 & 5 & -7 & -6 \\ 2 & 0 & 3 & 14 \end{bmatrix}$

D $N = \begin{bmatrix} -2 & 3 & 0 & -14 \\ 6 & 4 & 1 & 9 \\ 6 & 5 & 7 & 6 \end{bmatrix}$

Solution: C

As you're building out an augmented matrix, you want to be sure that you have all the variables in the same order, and all your constants grouped together on the same side of the equation. That way, with everything lined up, it'll be easy to make sure that each entry in a column represents the same variable or constant, and that each row in the matrix captures the entire equation.

To do this, the second two equations can be reorganized by putting a, b, and c on the left side, and the constant on the right side. We also recognize that there is no b-term in the third equation, so we add in a 0 "filler" term.

$$6a + 4b - c = 9$$

$$6a + 5b - 7c = -6$$

$$2a + 0b + 3c = 14$$

The system contains the variables a, b, and c, along with a constant. Which means the augmented matrix will have three columns, one for each variable, plus a column for the constants, so four columns in total. Because there are three equations in the system, the matrix will have three rows. Plugging the coefficients and constants into an augmented matrix gives

$$N = \begin{bmatrix} 6 & 4 & -1 & 9 \\ 6 & 5 & -7 & -6 \\ 2 & 0 & 3 & 14 \end{bmatrix}$$