

1. If  $A$ ,  $B$ , and  $C$  are not all 0, the graph of  $Ax + By + Cz = D$ , in 3-dimensional space is a

- A. plane
- B. parabola
- C. cone
- D. hyperbola

2. Write a system of linear equations in  $x$ ,  $y$ , and  $z$  that is represented by the augmented matrix.

$$\left[ \begin{array}{ccc|c} 1 & -9 & 9 & -7 \\ 3 & 6 & 4 & 1 \\ 2 & -4 & 8 & -7 \end{array} \right]$$

- A.  $\left\{ \begin{array}{l} 9x - 9y + z = -7 \\ 6x + 3y + 4z = 1 \\ 8x - 2y + 4z = -7 \end{array} \right\}$
- B.  $\left\{ \begin{array}{l} x - 9y + 9z = -7 \\ 3x + 6y + 4z = 1 \\ 2x - 8y + 4z = -7 \end{array} \right\}$
- C.  $\left\{ \begin{array}{l} x - 9y + 9z = -7 \\ 3x + 4y + 6z = 1 \\ 2x - 8y + 4z = -7 \end{array} \right\}$
- D.  $\left\{ \begin{array}{l} 9x - 9y + z = -7 \\ 6x + 3y + 4z = 1 \\ 8x - 4y + 2z = -7 \end{array} \right\}$
- E.  $\left\{ \begin{array}{l} 9x - 9y + z = -7 \\ 3x + 6y + 4z = 1 \\ 8x - 4y + 2z = -7 \end{array} \right\}$
- F.  $\left\{ \begin{array}{l} 9x - y + 9z = -7 \\ 3x + 6y + 4z = 1 \\ 8x - 2y + 4z = -7 \end{array} \right\}$
- G.  $\left\{ \begin{array}{l} 9x - 9y + z = -7 \\ 4x + 6y + 3z = 1 \\ 2x - 8y + 4z = -7 \end{array} \right\}$
- H.  $\left\{ \begin{array}{l} x - 9y + 9z = -7 \\ 3x + 6y + 4z = 1 \\ 2x - 4y + 8z = -7 \end{array} \right\}$

3. Write an augmented matrix for the system of equations.

$$\begin{cases} 5x - 9y - 2z = 6 \\ 9x + 7y - 8z = 4 \\ 8x - 4y - 7z = 0 \end{cases}$$

- A.  $\left[ \begin{array}{ccc|c} 9 & -5 & -2 & 6 \\ 9 & 8 & -7 & 4 \\ 4 & -8 & -7 & 0 \end{array} \right]$
- B.  $\left[ \begin{array}{ccc|c} 5 & -2 & -9 & 6 \\ 8 & 9 & -7 & 4 \\ 8 & -7 & -4 & 0 \end{array} \right]$
- C.  $\left[ \begin{array}{ccc|c} 5 & -9 & -2 & 6 \\ 9 & 7 & -8 & 4 \\ 8 & -4 & -7 & 0 \end{array} \right]$
- D.  $\left[ \begin{array}{ccc|c} 5 & -9 & -2 & 6 \\ 7 & 9 & -8 & 4 \\ 4 & -7 & -8 & 0 \end{array} \right]$
- E.  $\left[ \begin{array}{ccc|c} 5 & -9 & -2 & 6 \\ 8 & 7 & -9 & 4 \\ 4 & -8 & -7 & 0 \end{array} \right]$
- F.  $\left[ \begin{array}{ccc|c} 5 & -2 & -9 & 6 \\ 7 & 9 & -8 & 4 \\ 4 & -7 & -8 & 0 \end{array} \right]$
- G.  $\left[ \begin{array}{ccc|c} 5 & -9 & -2 & 6 \\ 7 & 9 & -8 & 4 \\ 4 & -7 & -8 & 0 \end{array} \right]$
- H.  $\left[ \begin{array}{ccc|c} 2 & -9 & -5 & 6 \\ 7 & 8 & -9 & 4 \\ 7 & -8 & -4 & 0 \end{array} \right]$

4. A  $3 \times 3$  system of linear equations has E equations in U unknowns.

- A.  $E = 3, U = 3$
- B.  $E = 2, U = 2$
- C.  $E = 3, U = 2$
- D.  $E = 2, U = 3$

5. In reduced row echelon form, a row of the form  $[ 0 \ 0 \ 0 \ \dots \ 0 \ k ]$ , where  $k \neq 0$ , represents a system of linear equations which is

- A. consistent and independent
- B. consistent and dependent
- C. inconsistent

6. Use an augmented matrix and elementary row operations to solve the system of linear equations.

$$\left\{ \begin{array}{l} x - 2y = 0 \\ 2x - z = 3 \\ 3x - y + 2z = 1 \end{array} \right\}$$

- A.  $x = \frac{14}{13}$   
 $y = -\frac{5}{39}$   
 $z = -\frac{57}{52}$
- B.  $x = \frac{14}{13}$   
 $y = \frac{7}{13}$   
 $z = -\frac{59}{39}$
- C.  $x = \frac{14}{13}$   
 $y = \frac{7}{13}$   
 $z = -\frac{11}{13}$
- D.  $x = \frac{16}{39}$   
 $y = -\frac{5}{39}$   
 $z = \frac{2}{13}$
- E.  $x = \frac{14}{13}$   
 $y = \frac{20}{13}$   
 $z = \frac{2}{13}$
- F.  $x = \frac{16}{39}$   
 $y = \frac{7}{13}$   
 $z = -\frac{46}{39}$
- G.  $x = \frac{16}{39}$   
 $y = \frac{20}{13}$   
 $z = -\frac{11}{13}$
- H.  $x = \frac{16}{39}$   
 $y = -\frac{30}{39}$   
 $z = -\frac{30}{39}$

7. Use an augmented matrix and elementary row operations to solve the system of linear equations.

$$\begin{cases} y + 3z = 2 \\ -3y - 2z = 3 \\ x - y = 0 \end{cases}$$

A.  $x = -\frac{25}{21}$   
 $y = -\frac{25}{21}$   
 $z = \frac{34}{21}$

B.  $x = -\frac{13}{7}$   
 $y = -\frac{25}{21}$   
 $z = \frac{16}{7}$

C.  $x = -\frac{13}{7}$   
 $y = -\frac{32}{21}$   
 $z = \frac{34}{21}$

D.  $x = -\frac{25}{21}$   
 $y = -\frac{25}{21}$   
 $z = \frac{41}{21}$

E.  $x = -\frac{13}{7}$   
 $y = -\frac{13}{7}$   
 $z = \frac{41}{21}$

F.  $x = -\frac{13}{7}$   
 $y = -\frac{13}{7}$   
 $z = \frac{9}{7}$

G.  $x = -\frac{25}{21}$   
 $y = -\frac{32}{21}$   
 $z = \frac{9}{7}$

H.  $x = -\frac{25}{21}$   
 $y = -\frac{13}{7}$   
 $z = \frac{13}{21}$

8. A farmer must decide how many acres of each of three crops to plant during this growing season. The farmer must pay a certain amount for seed and devote a certain amount of labor and water to each acre of crop planted, as shown in the following table. The amount of money available to pay for seed is \$26000. The farmer's family can devote 2900 hours to tending the crops, and the farmer has access to 210000 gal of water for irrigation. How many acres of each crop would use all these resources? Round your answer to the nearest hundredth.

	<i>A</i>	<i>B</i>	<i>C</i>
Seed Cost (\$/acre)	105	80	120
Labor (hours/acre)	12	9	10
Water (gallons/acre)	700	800	500

- A. To use all of these resources, the farmer should plant 116.13 acres of crop *A*, 94.53 acres of crop *B*, and 44.64 g of crop *C*.
- B. To use all of these resources, the farmer should plant 33.13 acres of crop *A*, 69.53 acres of crop *B*, and 44.64 g of crop *C*.
- C. To use all of these resources, the farmer should plant 116.13 acres of crop *A*, 69.53 acres of crop *B*, and 75.64 g of crop *C*.
- D. To use all of these resources, the farmer should plant 33.13 acres of crop *A*, 94.53 acres of crop *B*, and 13.36 g of crop *C*.
- E. To use all of these resources, the farmer should plant 116.13 acres of crop *A*, 152.53 acres of crop *B*, and 69.64 g of crop *C*.
- F. To use all of these resources, the farmer should plant 33.13 acres of crop *A*, 69.53 acres of crop *B*, and 69.64 g of crop *C*.
- G. To use all of these resources, the farmer should plant 33.13 acres of crop *A*, 152.53 acres of crop *B*, and 5.64 g of crop *C*.
- H. To use all of these resources, the farmer should plant 116.13 acres of crop *A*, 152.53 acres of crop *B*, and 13.36 g of crop *C*.