Score: 1 of 1 pt

1.1.19

Determine the value(s) of h such that the matrix is the augmented matrix of a consistent linear system.

$$\begin{bmatrix} 1 & h & 2 \\ 4 & 20 & 6 \end{bmatrix}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The matrix is the augmented matrix of a consistent linear system if $h \neq$ 5 .
(Use a comma to separate answers as needed. Type an integer or a simplified fraction.)
- B. The matrix is the augmented matrix of a consistent linear system if h = .
(Use a comma to separate answers as needed. Type an integer or a simplified fraction.)
- C. The matrix is the augmented matrix of a consistent linear system for every value of h.
- D. The matrix is not the augmented matrix of a consistent linear system for any value of h.

Score: 1 of 1 pt

Test Score: 100%, 8

1.2.4

Row reduce the matrix to reduced echelon form. Identify the pivot positions in the final matrix and in the original matrix, and list the pivot columns.

$$\begin{bmatrix} 1 & 2 & 4 & -11 \\ 2 & 4 & 6 & -18 \\ 4 & 6 & 8 & -26 \end{bmatrix}$$

Row reduce the matrix to reduced echelon form and identify the pivot positions in the final matrix. The pivot positions are indicated by bold values. Choose the correct answer below.

A. $\begin{bmatrix} \mathbf{1} & 0 & 0 & -1 \\ 0 & \mathbf{1} & 0 & -1 \\ 0 & 0 & \mathbf{1} & -2 \end{bmatrix}$

B. $\begin{bmatrix} \mathbf{1} & 0 & 0 & 0 \\ 0 & \mathbf{1} & 0 & 0 \\ 0 & 0 & \mathbf{1} & \mathbf{1} \end{bmatrix}$

C. $\begin{bmatrix} \mathbf{1} & 0 & 0 & -2 \\ 0 & \mathbf{1} & 0 & -2 \\ 0 & 0 & \mathbf{1} & -1 \end{bmatrix}$

D. $\begin{bmatrix} \mathbf{1} & 0 & 0 & -2 \\ 0 & \mathbf{1} & 0 & \mathbf{1} \\ 0 & 0 & \mathbf{1} & 0 \end{bmatrix}$

Identify the pivot positions in the original matrix. The pivot positions are indicated by bold values. Choose the correct answer below.

A. $\begin{bmatrix} \mathbf{1} & 2 & 4 & -11 \\ 2 & \mathbf{4} & 6 & -18 \\ 4 & 6 & \mathbf{8} & \mathbf{-26} \end{bmatrix}$

B. $\begin{bmatrix} 1 & 2 & 4 & \mathbf{-11} \\ 2 & 4 & \mathbf{6} & -18 \\ 4 & \mathbf{6} & 8 & -26 \end{bmatrix}$

C. $\begin{bmatrix} \mathbf{1} & 2 & 4 & -11 \\ 2 & \mathbf{4} & 6 & -18 \\ 4 & 6 & \mathbf{8} & -26 \end{bmatrix}$

D. $\begin{bmatrix} \mathbf{1} & 2 & 4 & -11 \\ \mathbf{2} & 4 & 6 & -18 \\ \mathbf{4} & 6 & 8 & -26 \end{bmatrix}$

List the pivot columns. Select all that apply.

- A. Column 1
- B. Column 4
- C. Column 2
- D. Column 3

Score: 1 of 1 pt | 3 of 8 | Test Score: 100%,

1.2.11

Find the general solution of the system whose augmented matrix is given below.

$$\begin{bmatrix} 2 & -3 & 5 & 0 \\ 6 & -9 & 15 & 0 \\ 8 & -12 & 20 & 0 \end{bmatrix}$$

Choose the correct answer below.

A. $\begin{cases} x_1 = -2x_2 \\ x_2 = 3x_3 \\ x_3 \text{ is free} \end{cases}$

B. $\begin{cases} x_1 = \frac{3}{2}x_2 - \frac{5}{2}x_3 \\ x_2 \text{ is free} \\ x_3 \text{ is free} \end{cases}$

C. $\begin{cases} x_1 = 2 \\ x_2 = -3 \\ x_3 = 5 \end{cases}$

D. The system has no solutions.

Score: 1 of 1 pt | 4 of 8

1.2.19

Choose h and k such that the system has (a) no solution, (b) a unique solution, and (c) many solutions.

$$x_1 + hx_2 = 5$$
$$2x_1 + 4x_2 = k$$

a. Select the correct answer below and fill in the answer box(es) to complete your choice.
(Type an integer or simplified fraction.)

A. The system has no solutions only when h ≠ ☐ and k = ☐.

B. The system has no solutions only when k ≠ ☐ and h is any real number.

C. The system has no solutions only when h = 2 and k ≠ 10.

D. The system has no solutions only when h ≠ ☐ and k is any real number.

E. The system has no solutions only when h = ☐ and k = ☐.

F. The system has no solutions only when h ≠ ☐ and k ≠ ☐.

G. The system has no solutions only when h = ☐ and k is any real number.

H. The system has no solutions only when k = ☐ and h is any real number.

b. Select the correct answer below and fill in the answer box(es) to complete your choice.
(Type an integer or simplified fraction.)

- A. The system has a unique solution only when $k =$ ☐ and h is any real number.
- B. The system has a unique solution only when $h =$ ☐ and $k \neq$ ☐.
- C. The system has a unique solution only when $k \neq$ ☐ and h is any real number.
- D. The system has a unique solution only when $h \neq$ ☐ and $k \neq$ ☐.
- E. The system has a unique solution only when $h \neq$ 2 and k is any real number.
- F. The system has a unique solution only when $h =$ ☐ and $k =$ ☐.
- G. The system has a unique solution only when $h \neq$ ☐ and $k =$ ☐.
- H. The system has a unique solution only when $h =$ ☐ and k is any real number.

c. Select the correct answer below and fill in the answer box(es) to complete your choice.
(Type an integer or simplified fraction.)

- A. The system has many solutions only when $k \neq$ ☐ and h is any real number.
- B. The system has many solutions only when $h =$ ☐ and $k \neq$ ☐.
- C. The system has many solutions only when $h =$ 2 and $k =$ 10.
- D. The system has many solutions only when $h \neq$ ☐ and $k \neq$ ☐.
- E. The system has many solutions only when $h \neq$ ☐ and k is any real number.
- F. The system has many solutions only when $h \neq$ ☐ and $k =$ ☐.
- G. The system has many solutions only when $k =$ ☐ and h is any real number.
- H. The system has many solutions only when $h =$ ☐ and k is any real number.

Score: 1 of 1 pt

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1.3.17

Let $\mathbf{a}_1 = \begin{bmatrix} 1 \\ 5 \\ -1 \end{bmatrix}$, $\mathbf{a}_2 = \begin{bmatrix} -7 \\ -31 \\ 3 \end{bmatrix}$, and $\mathbf{b} = \begin{bmatrix} 5 \\ 13 \\ h \end{bmatrix}$. For what value(s) of h is $\mathbf{b}$ in the plane spanned by $\mathbf{a}_1$ and $\mathbf{a}_2$?

The value(s) of h is(are) 7. (Use a comma to separate answers as needed.)

1.3.26

Let $A = \begin{bmatrix} 4 & 6 & 8 \\ -2 & 6 & 5 \\ 2 & 0 & 1 \end{bmatrix}$, let $\mathbf{b} = \begin{bmatrix} 12 \\ 3 \\ 7 \end{bmatrix}$, and let W be the set of all linear combinations of the columns of A.

a. Is **b** in W?
b. Show that the second column of A is in W.

a. Set up the appropriate augmented matrix for determining if **b** is in W.

$$\begin{bmatrix} 4 & 6 & 8 & 12 \\ -2 & 6 & 5 & 3 \\ 2 & 0 & 1 & 7 \end{bmatrix}$$

(Simplify your answers.)

Is **b** in W?

- A. No, because the row-reduced form of the augmented matrix has a pivot in the rightmost column.
- B. No, because the row-reduced form of the augmented matrix does not have a pivot in the rightmost column.
- C. Yes, because the row-reduced form of the augmented matrix has a pivot in the rightmost column.
- D. Yes, because the row-reduced form of the augmented matrix does not have a pivot in the rightmost column.

b. Show that the second column of A is in W.

The second column of A is the vector $\mathbf{a}_2$. The vector $\mathbf{a}_2$ is in W because $\mathbf{a}_2$ can be written as a linear combination $c_1\mathbf{a}_1 + c_2\mathbf{a}_2 + c_3\mathbf{a}_3$ where c_1, c_2, and c_3 are scalars.

Thus, the second column of A is in W because $\mathbf{a}_2 = 0\,\mathbf{a}_1 + 1\,\mathbf{a}_2 + 0\,\mathbf{a}_3$.
(Simplify your answers.)

1.4.11

Given A and **b** to the right, write the augmented matrix for the linear system that corresponds to the matrix equation A**x** = **b**. Then solve the system and write the solution as a vector.

$A = \begin{bmatrix} 1 & 3 & -2 \\ 1 & 2 & 2 \\ 3 & 2 & 4 \end{bmatrix}$, $\mathbf{b} = \begin{bmatrix} 6 \\ 3 \\ -3 \end{bmatrix}$

Write the augmented matrix for the linear system that corresponds to the matrix equation A**x** = **b**. Select the correct choice below and fill in any answer boxes within your choice.

- A. $\begin{bmatrix} \square & \square & \square \\ \square & \square & \square \\ \square & \square & \square \end{bmatrix}$
- B. $\begin{bmatrix} 1 & 3 & -2 & 6 \\ 1 & 2 & 2 & 3 \\ 3 & 2 & 4 & -3 \end{bmatrix}$

Solve the system and write the solution as a vector. Select the correct choice below and fill in any answer boxes within your choice.

- A. $\mathbf{x} = \begin{bmatrix} -3 \\ 3 \\ 0 \end{bmatrix}$
- B. $\mathbf{x} = \begin{bmatrix} \square \\ \square \end{bmatrix}$

Score: 1 of 1 pt

1.4.18

Do the columns of A span $\mathbb{R}^4$? Does the equation $A\mathbf{x} = \mathbf{b}$ have a solution for each $\mathbf{b}$ in $\mathbb{R}^4$?

$$A = \begin{bmatrix} 2 & 4 & -2 & 0 \\ 1 & 0 & -3 & 4 \\ 2 & 3 & -3 & 2 \\ -3 & -8 & 1 & 1 \end{bmatrix}$$

Do the columns of A span $\mathbb{R}^4$? Select the correct choice below and fill in the answer box to complete your choice.
(Type an integer or decimal for each matrix element.)

A. Yes, because the reduced row echelon form of A is ☐.

B. No, because the reduced row echelon form of A is $\begin{bmatrix} 1 & 0 & -3 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$.

Does the equation $A\mathbf{x} = \mathbf{b}$ have a solution for each $\mathbf{b}$ in $\mathbb{R}^4$?

A. Yes, because A does not have a pivot position in every row.

B. Yes, because the columns of A span $\mathbb{R}^4$.

C. No, because A has a pivot position in every row.

D. No, because the columns of A do not span $\mathbb{R}^4$.