1. Fill in the blanks to correctly complete the following sentence.

   For the following statement to be true, the value of x must be _____, and the value of y must be _____. (Simplify your answers.)

$$\begin{bmatrix} 10 & -6 \\ 6 & 13 \end{bmatrix} = \begin{bmatrix} x+6 & -6 \\ 6 & y+6 \end{bmatrix}$$

---

2. Fill in the blanks to correctly complete the following sentence.

   For the following sum to be true, we must have w = _____, x = _____, y = _____, and z = _____.
   (Simplify your answers.)

$$\begin{bmatrix} 5 & 2 \\ -6 & 0 \end{bmatrix} + \begin{bmatrix} 6 & 3 \\ 4 & 9 \end{bmatrix} = \begin{bmatrix} w & x \\ y & z \end{bmatrix}$$

---

3. Fill in the blanks to correctly complete the following sentence.

   For the following difference to be true, we must have w = _____, x = _____, y = _____, and z = _____. (Simplify your answers.)

$$\begin{bmatrix} 5 & 8 \\ 8 & 12 \end{bmatrix} - \begin{bmatrix} 3 & 9 \\ 6 & 1 \end{bmatrix} = \begin{bmatrix} w & x \\ y & z \end{bmatrix}$$

---

4. Fill in the blanks to correctly complete the following sentence.

   For the following scalar product to be true, we must have w = _____, x = _____, y = _____, and z = _____. (Simplify your answers.)

$$-8 \begin{bmatrix} 1 & -3 \\ 1 & 7 \end{bmatrix} = \begin{bmatrix} w & x \\ y & z \end{bmatrix}$$

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5. Fill in the blanks to correctly complete each sentence.

   If the dimension of matrix A is 3×3 and the dimension of matrix B is 3×5, then the dimension of AB is _____ $\times$ _____.

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6. Fill in the blanks to correctly complete the following sentence.

   For the following matrix product to be true, we must have x = _____.

$$\begin{bmatrix} 3 & 4 \\ -4 & 3 \end{bmatrix} \begin{bmatrix} 3 & -3 \\ 1 & 1 \end{bmatrix} = \begin{bmatrix} x & -5 \\ -9 & 15 \end{bmatrix}$$

---

7. Find the dimension of the following matrix. Identify whether it is a square, column, or row matrix.

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

The matrix is _____ × _____.

Choose the correct type of matrix.

- **A.** column matrix
- **B.** row matrix
- **C.** square matrix
- **D.** no special type

8. Find the dimension of the following matrix. Identify whether it is a square, column, or row matrix.

$$\begin{bmatrix} -6 & 4 & 0 & 2 \\ 8 & 1 & 9 & 0 \end{bmatrix}$$

The matrix is _____ × _____.

Choose the correct type of matrix.

- **A.** no special type
- **B.** column matrix
- **C.** square matrix
- **D.** row matrix

9. Find the size of the matrix. Identify a square, column, or row matrix.

$$\begin{bmatrix} 1 \\ 7 \end{bmatrix}$$

The size of the matrix is _____ × _____.

The matrix is (1) _____

(1)
- a row matrix.
- of no special type.
- a column matrix.
- a square matrix.

10. Find the values of the variables for which the statement is true, if possible.

$$\begin{bmatrix} -6 & x \\ y & -2 \end{bmatrix} = \begin{bmatrix} w & 0 \\ 7 & z \end{bmatrix}$$

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

- **A.** The statement is true for w = _____, x = _____, y = _____, and z = _____.
- **B.** There are no values of the variables for which the statement is true.

11. Find the values of the variables for which the statement is true, if possible.

$$\begin{bmatrix} x+1 & y-6 \\ z-3 & w+5 \end{bmatrix} = \begin{bmatrix} -1 & 7 \\ 0 & 3 \end{bmatrix}$$

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

- **A.** The statement is true for w = _____, x = _____, y = _____, and z = _____.
- **B.** There are no values of the variables for which the statement is true.

12. Find the values of the variables for which the statement is true, if possible.

$$[x \quad y \quad z] = [18 \quad 8]$$

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

- **A.** The statement is true for x = _____, y = _____, and z = _____.
- **B.** There are no values of the variables for which the statement is true.

13. Find the values of the variables for which each statement is true, if possible.

$$\begin{bmatrix} a+7 & 8z+1 & 2m \\ 2k & 0 & 2 \end{bmatrix} + \begin{bmatrix} 9a & 3z & 11m \\ 9k & 1 & 5 \end{bmatrix} = \begin{bmatrix} 27 & -32 & 52 \\ 33 & 1 & 7 \end{bmatrix}$$

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

- **A.** The statement is true for a = _____, k = _____, m = _____, and z = _____.
- **B.** There are no values of the variables for which the statement is true.

14. Perform the indicated operation if possible.

$$\begin{bmatrix} 7 & 0 \\ 3 & 5 \end{bmatrix} + \begin{bmatrix} 3 & -3 \\ -1 & -8 \end{bmatrix}$$

Select the correct choice below and fill in any answer boxes present in your choice.

- **A.** The resulting matrix is _____. (Simplify your answer.)
- **B.** The resulting matrix does not exist because the operation is not possible.

15. Add the following matrices.

$$\begin{bmatrix} 4 & -1 & 1 \end{bmatrix} + \begin{bmatrix} 8 \\ 7 \\ -4 \end{bmatrix}$$

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

- **A.** $\begin{bmatrix} 4 & -1 & 1 \end{bmatrix} + \begin{bmatrix} 8 \\ 7 \\ -4 \end{bmatrix} =$ _____

  (Type an integer or decimal for each matrix element.)
- **B.** The operation is not defined.

16. Let $A = \begin{bmatrix} 1 & 2 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} -6 & 5 \\ 5 & 6 \end{bmatrix}$.

Find $4A + 2B$.

$4A + 2B =$ _____

17. Suppose that matrix A has dimension 4×1 and that matrix B has dimension 1×4. Decide whether the product AB can be calculated. If it can, determine its dimension.

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

- **A.** The size of the resulting matrix AB is _____ × _____.
- **B.** The product cannot be calculated.

18. Suppose that matrix A has dimension 1×5 and that matrix B has dimension 5×2. Decide whether the product BA can be calculated. If it can, determine its dimension.

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

- **A.** The size of the resulting matrix BA is _____ × _____.
- **B.** The product cannot be calculated.

19. Suppose that matrix A has dimension 4×5 and that matrix B has dimension 5×1. Decide whether the product AB can be calculated. If it can, determine its dimension.

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

- **A.** The size of the resulting matrix AB is _____ × _____.
- **B.** The product cannot be calculated.

---

20. Find the product of the following matrices, if possible.

$$\begin{bmatrix} 4 & -8 \\ 1 & 6 \end{bmatrix}\begin{bmatrix} -2 \\ 3 \end{bmatrix}$$

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

- **A.** $\begin{bmatrix} 4 & -8 \\ 1 & 6 \end{bmatrix}\begin{bmatrix} -2 \\ 3 \end{bmatrix} =$ _____ (Simplify your answer.)
- **B.** The product is not defined.

---

21. Find the product of the following matrices, if possible.

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

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

- **A.** $\begin{bmatrix} -5 & 0 & 6 & 1 \\ 4 & 0 & 2 & 5 \end{bmatrix}\begin{bmatrix} -3 & 3 \\ 0 & 1 \end{bmatrix} =$ _____
  (Simplify your answer. Type an exact answer, using radicals as needed.)
- **B.** The product is not defined.

---

22. Find the matrix product if possible.

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

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

- **A.** $\begin{bmatrix} -3 & 4 & 2 \end{bmatrix}\begin{bmatrix} 3 & -2 & 2 \\ 4 & 1 & 0 \\ 0 & -2 & 4 \end{bmatrix} =$ _____ (Simplify your answer.)
- **B.** The matrix product does not exist.

---

23. Find the product of the following matrices, if possible.

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

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

○ **A.** $\begin{bmatrix} -3 & 3 & 1 \\ -1 & 1 & 4 \\ -4 & -3 & 3 \end{bmatrix} \begin{bmatrix} 3 & -1 & -4 \\ 0 & 1 & 3 \\ 2 & -4 & 3 \end{bmatrix} =$ _____

(Simplify your answer. Type an exact answer, using radicals as needed.)

○ **B.** The product is not defined.

---

24. For $A = \begin{bmatrix} 4 & 4 \\ -1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 0 \\ 3 & -7 \end{bmatrix}$, find (a) AB and (b) BA.

(a) AB = _____

(b) BA = _____

---

25. What is the product of $\begin{bmatrix} 2 & 5 \\ -8 & 4 \end{bmatrix}$ and I_2 (in either order)?

The product of $\begin{bmatrix} 2 & 5 \\ -8 & 4 \end{bmatrix}$ and I_2 is _____.

---

26. It can be shown that the following matrices are inverses. What is their product (in either order)?

$$\begin{bmatrix} 10 & 1 \\ 9 & 1 \end{bmatrix} \text{ and } \begin{bmatrix} 1 & -1 \\ -9 & 10 \end{bmatrix}$$

The product of $\begin{bmatrix} 10 & 1 \\ 9 & 1 \end{bmatrix}$ and $\begin{bmatrix} 1 & -1 \\ -9 & 10 \end{bmatrix}$ is _____.

(Type an integer or simplified fraction for each matrix element.)

---

27. What is the coefficient matrix of the following system?

$$\begin{aligned} 3x - 6y &= 10 \\ -x + 3y &= 5 \end{aligned}$$

The coefficient matrix of the given system is _____.

(Type an integer or simplified fraction for each matrix element.)

---

28. What is the matrix equation form of the following system?

$$\begin{aligned} 10x + 5y &= 30 \\ 5x - y &= 8 \end{aligned}$$

The matrix equation form of the given system is _____.

---

29. Decide whether or not the given matrices are inverses of each other. (Hint: Check to see whether their products are the identity matrix I_n.)

$$\begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix} \text{ and } \begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$$

Are the matrices inverses of each other?

- ○ No
- ○ Yes

---

30. Decide whether or not the given matrices are inverses of each other. (Hint: Check to see whether their products are the identity matrix I_n.)

$$\begin{bmatrix} 1 & -7 \\ -3 & 4 \end{bmatrix} \text{ and } \begin{bmatrix} 4 & 7 \\ 3 & 1 \end{bmatrix}$$

Are the matrices inverses of each other?

- ○ No
- ○ Yes

---

31. Find the inverse, if it exists, for the matrix.

$$\begin{bmatrix} -1 & 4 \\ -5 & -1 \end{bmatrix}$$

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

- ○ **A.** The inverse of the matrix is _____.
  (Type an integer or simplified fraction for each matrix element.)
- ○ **B.** The inverse does not exist.

---

32. Find the inverse, if it exists, for the matrix.

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

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

- ○ **A.** The inverse of the matrix is _____.
  (Type an integer or simplified fraction for each matrix element.)
- ○ **B.** The inverse does not exist.

---

33. Find the inverse, if it exists, for the matrix.

$$\begin{bmatrix} -4 & -8 \\ 4 & 8 \end{bmatrix}$$

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

- **A.** The inverse of the matrix is _____.
  (Type an integer or simplified fraction for each matrix element.)
- **B.** The inverse does not exist.

34. Solve the system by using the inverse of the coefficient matrix.

$$\begin{aligned} -x + y &= -1 \\ 4x - 3y &= 6 \end{aligned}$$

What is the inverse of the coefficient matrix?

_____ (Type an integer or simplified fraction for each matrix element.)

The solution set of the system is $\{$_____$\}$.
(Simplify your answer. Type an ordered pair.)

35. Solve the system by using the inverse of the coefficient matrix.

$$\begin{aligned} x + 5y &= -17 \\ -3x + 8y &= -41 \end{aligned}$$

The solution set of the system is $\{$_____$\}$.
(Simplify your answer. Type an ordered pair.)

36. Solve the system by using the inverse of the coefficient matrix.

$$\begin{aligned} x + y + z &= 3 \\ 4x + 3y - z &= 3 \\ 3x - y - z &= 1 \end{aligned}$$

The solution set is $\{($_____,_____,_____$)\}$.
(Simplify your answer. Type integers or simplified fractions.)

37. Solve the system by using the inverse of the coefficient matrix.

$$\begin{aligned} 7x - y + 7z &= 6 \\ -8y + 6z &= 4 \\ -4x + 6y + 8z &= 26 \end{aligned}$$

The solution set is $\{($_____,_____,_____$)\}$.
(Simplify your answer.)

38. Solve the following system by using the inverse of the coefficient matrix.

$$\begin{aligned} x + 5y - 7z - w &= 4 \\ 2x + y + z + 3w &= -15 \\ 3x - y + z - w &= -8 \\ x - y - 3z - 2w &= 11 \end{aligned}$$

The solution set is {(_____, _____, _____, _____)}.