Name: _____

EV Readiness Clontz Fall 2023 ID: _____

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1. Which of the following augmented matrices corresponds to the following system of linear equations?

$$\begin{aligned} -4x_1 + 6x_2 + 9x_3 &= 4 \\ -8x_1 - 7x_2 + 7x_4 &= 5 \end{aligned}$$

- (a) $\left[\begin{array}{cccc|c} -4 & 6 & 9 & 0 & 4 \\ -8 & -7 & 0 & 7 & 5 \end{array}\right]$
- (b) $\left[\begin{array}{c|c} -4 & -8 \\ 6 & -7 \\ 9 & 0 \\ 0 & 7 \\ 4 & 5 \end{array}\right]$
- (c) $\left[\begin{array}{ccc|c} -4 & 6 & 9 & 4 \\ -8 & -7 & 7 & 5 \end{array}\right]$
- (d) $\left[\begin{array}{c|c} -4 & -8 \\ 6 & -7 \\ 9 & 7 \\ 4 & 5 \end{array}\right]$

2. Simplify the following Euclidean vector expression.

$$8\begin{bmatrix} -3 \\ 3 \end{bmatrix} + -8\begin{bmatrix} 4 \\ 7 \end{bmatrix}$$

- (a) $\begin{bmatrix} -58 \\ -34 \end{bmatrix}$
- (b) $\begin{bmatrix} -56 \\ -34 \end{bmatrix}$
- (c) $\begin{bmatrix} -56 \\ -32 \end{bmatrix}$
- (d) $\begin{bmatrix} -58 \\ -32 \end{bmatrix}$

3. Find RREF $\begin{bmatrix} 1 & -2 & -1 & -6 \\ 0 & 1 & -1 & -2 \\ 3 & -4 & -4 & -19 \end{bmatrix}$.

- (a) $\begin{bmatrix} 1 & -2 & 0 & 1 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$
- (b) $\begin{bmatrix} 1 & -1 & 0 & -2 \\ 0 & 0 & 1 & -3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$
- (c) $\begin{bmatrix} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 3 \end{bmatrix}$
- (d) $\begin{bmatrix} 1 & -2 & 0 & -2 \\ 0 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

4. Which of the following choices belongs to the following set?

$$\left\{ \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \middle| 4x_2 = -3x_1 - 8 \right\}$$

- (a) $\begin{bmatrix} 2 \\ -2 \end{bmatrix}$
- (b) $\begin{bmatrix} -5 \\ -6 \end{bmatrix}$
- (c) $\begin{bmatrix} 4 \\ -5 \end{bmatrix}$
- (d) $\begin{bmatrix} -6 \\ 2 \end{bmatrix}$

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5. Find the solution set for

$$\begin{array}{rcrcrcl} x_1 & - & 2\,x_2 & & & - & 3\,x_4 & = & 4 \\ -x_1 & & & - & 2\,x_3 & + & 3\,x_4 & = & 2 \\ & & 3\,x_2 & + & 3\,x_3 & & & = & -9 \end{array}$$

- (a) $\left\{ \left[\begin{array}{c} -2\,a+3\,b-2 \\ -a-3 \\ a \\ b \end{array} \right] \middle| a,b \in \mathbb{R} \right\}$
- (b) $\left\{ \left[\begin{array}{c} -2\,a \\ -a \\ -3\,a \\ a \end{array} \right] \middle| a \in \mathbb{R} \right\}$
- (c) $\left\{ \left[\begin{array}{c} 3\,a+2 \\ -1 \\ a \\ -3 \end{array} \right] \middle| a \in \mathbb{R} \right\}$
- (d) $\emptyset$

6. Which of the following augmented matrices is equivalent to the following matrix?

$$\left[\begin{array}{ccc|c} 4 & -4 & -3 & 26 \\ 0 & 1 & -1 & -1 \\ -1 & 0 & 2 & -6 \end{array} \right]$$

- (a) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & -1 & 3 \\ 0 & 0 & 0 & 0 \end{array} \right]$
- (b) $\left[\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & -2 \end{array} \right]$
- (c) $\left[\begin{array}{ccc|c} 1 & -1 & 0 & 5 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 \end{array} \right]$
- (d) $\left[\begin{array}{ccc|c} 1 & 0 & 3 & -3 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 0 & 0 \end{array} \right]$

7. Find the solution set for

$$\begin{array}{rcrcrcl} -x_1 & - & x_2 & & & = & -1 \\ x_1 & - & 4\,x_2 & - & 10\,x_3 & = & -4 \\ -x_1 & + & 2\,x_2 & + & 6\,x_3 & = & 2 \\ -3\,x_1 & - & 9\,x_2 & - & 12\,x_3 & = & -11 \end{array}$$

- (a) $\left\{ \left[\begin{array}{c} 9 \\ 3 \\ -7 \end{array} \right] \right\}$
- (b) $\left\{ \left[\begin{array}{c} 2 \\ -1 \\ -2 \end{array} \right] \right\}$
- (c) $\left\{ \left[\begin{array}{c} 4 \\ -4 \\ -8 \end{array} \right] \right\}$
- (d) $\emptyset$

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8. Which of the following choices belongs to the following set?

$$\left\{ \begin{bmatrix} x \\ y \end{bmatrix} \middle| 6y = -4x - 24 \right\}$$

- (a) $\begin{bmatrix} 5 \\ -2 \end{bmatrix}$
- (b) $\begin{bmatrix} -2 \\ 2 \end{bmatrix}$
- (c) $\begin{bmatrix} -6 \\ 5 \end{bmatrix}$
- (d) $\begin{bmatrix} 3 \\ -6 \end{bmatrix}$

9. Find the solution set for

$$\begin{array}{rcrcrcr} 3x_1 & - & 4x_2 & - & 4x_3 & = & 18 \\ -2x_1 & + & 3x_2 & + & 4x_3 & = & -15 \\ x_1 & - & 2x_2 & - & 3x_3 & = & 10 \\ 7x_1 & - & 11x_2 & - & 13x_3 & = & 51 \end{array}$$

- (a) $\left\{ \begin{bmatrix} 9 \\ 3 \\ -7 \end{bmatrix} \right\}$
- (b) $\left\{ \begin{bmatrix} 4 \\ -4 \\ -8 \end{bmatrix} \right\}$
- (c) $\left\{ \begin{bmatrix} 2 \\ -1 \\ -2 \end{bmatrix} \right\}$
- (d) $\emptyset$

10. Simplify the following Euclidean vector expression.

$$-6\left(\begin{bmatrix} -8 \\ 3 \end{bmatrix} + \begin{bmatrix} 2 \\ -5 \end{bmatrix} \right)$$

- (a) $\begin{bmatrix} 36 \\ 12 \end{bmatrix}$
- (b) $\begin{bmatrix} 38 \\ 15 \end{bmatrix}$
- (c) $\begin{bmatrix} 36 \\ 15 \end{bmatrix}$
- (d) $\begin{bmatrix} 38 \\ 12 \end{bmatrix}$