GSE PreCalculus
Test 1 Review— Matrices

Name KEY

Use the following matrices for problems 1-10

$D = \begin{bmatrix} -2 & 5 \\ 4 & -11 \\ 4 & -7 \end{bmatrix}$ $E = \begin{bmatrix} 8 & -4 & 2 \\ 3 & 1 & -5 \end{bmatrix}$ $F = \begin{bmatrix} 3 & 5 \\ -1 & 8 \end{bmatrix}$ $G = \begin{bmatrix} -1 & 3 \\ -1 & 2 \end{bmatrix}$

1. 3D

$\begin{bmatrix} -6 & 15 \\ 27 & -33 \\ 12 & -21 \end{bmatrix}$

2. 3F + 4G

~~$\begin{bmatrix} 10 & -2 \\ 2 & 8 \end{bmatrix}$~~

$\begin{bmatrix} 5 & 27 \\ -7 & 32 \end{bmatrix}$

3. 2F – 4E

Cannot add

4. |F|

29

5. |E|

Cannot find not a square matrix

6. D^{-1}

Cannot find not a square matrix

7. F^{-1}

$\begin{bmatrix} 8/29 & -5/29 \\ 1/29 & 3/29 \end{bmatrix}$

8. DE

$\begin{bmatrix} -1 & 13 & -29 \\ 39 & -47 & 73 \\ 11 & -23 & 43 \end{bmatrix}$

9. EG

Cannot multiply

10. FF^{-1}

$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

11. Find the determinant of: $\begin{bmatrix} 4 & 2 \\ 2 & 1 \end{bmatrix}$

$4 - 4$

$= 0 \Rightarrow$ means the matrix has no inverse

12. Solve for x and y: $\begin{bmatrix} 2 & 3y \\ -1 & 10 \end{bmatrix} + \begin{bmatrix} -5 & 4 \\ 5 & -2 \end{bmatrix} = \begin{bmatrix} -3 & 19 \\ 4 & x \end{bmatrix}$

$3y + 4 = 19$
$3y = 15$
$y = 5$

$10 - 2 = x$
$8 = x$

$x = 8$
$y = 5$

13. The dimensions of Matrix A are 2 x 4 and the dimensions of Matrix C are 2 x 3. If A * B = C, then what are the dimensions of Matrix B?

$A \cdot B = C$
$2 \times 4 \quad 4 \times 3 \quad 2 \times 3$

4 x 3

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14. Solve for x: $\begin{vmatrix} x & -2 \\ 6 & x \end{vmatrix} = -8x$

$x^2 - 12 = -8x$
$x^2 + 8x + 12 = 0$
$(x+6)(x+2)$

$x = -6, -2$

15. Solve for Matrix X: $\begin{bmatrix} -1 & 1 \\ 5 & -2 \end{bmatrix}[X] = \begin{bmatrix} 4 \\ -7 \end{bmatrix}$

$A \cdot X = B$
$A^{-1} \cdot A \cdot X = A^{-1} \cdot B$

$\begin{bmatrix} 1/3 \\ 13/3 \end{bmatrix} = \begin{bmatrix} .33 \\ 4.33 \end{bmatrix}$

16. Solve for x, y, and w: $3\begin{bmatrix} -2x & 2 \\ -5y & 3w \end{bmatrix} = \begin{bmatrix} 18 & 6 \\ -30 & -9x \end{bmatrix}$

$-6x \quad 6$
$-15y \quad 9w$

$-6x = 18$
$x = -3$
$-15y = -30$
$y = 2$
$9w = -9(-3)$
$w = 3^{27}$

$x = -3$
$y = 2$
$w = 3$

17. Write as a system of linear equations: $\begin{bmatrix} 1 & -2 \\ 7 & -3 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 8 \\ -5 \end{bmatrix}$

$x - 2y = 8$
$7x - 3y = -5$

18. Solve: $2x + 3y = 4$
$6y = 5x + 5$

$2x + 3y = 4$
$-5x + 6y = 5$

$x = 1/3 = .\overline{33}$
$y = 10/9 = 1.\overline{11}$

19. Solve: $9x + 7y = -30$
$8y + 5z = 11$
$-3x + 10z = 73$

$x = -1$
$y = -3$
$z = 7$

20. A Greek deli sells small and jumbo gyros. A small gyro costs $3.50 and a jumbo gyro costs $5.25. At lunch one day they sold 25 gyros for a total of $127.75. How many of each type of gyro did they sell?

x = small
y = jumbo

$3.50x + 5.25y = 127.75$
$x + y = 25$

$x = 2$ small
$y = 23$ jumbo