

Matrix Review – due on day of test; use a SEPARATE SHEET OF PAPER & SHOW ALL WORK!

Questions with * next to them are comparable to problems on the CALCULATOR section of the test.

The rest will appear on NON-CALCULATOR part of the test!!

#1 – 2. State the dimensions of the matrix. Identify the indicated elementy.

$$1. \quad *A = \begin{bmatrix} -9 & 1 \\ -5 & 0 \\ -3 & 8 \end{bmatrix}, a_{3,2}$$

$$2. \quad *A = \begin{bmatrix} 2 & -1 & 15 & 0 \\ 5 & 6 & 1 & 9 \end{bmatrix}, a_{2,3}$$

#3 – 4. Use matrices A, B, and C. Find the sum or difference if you can.

$$A = \begin{bmatrix} -5 & 4 \\ -8 & 2 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 7 & -3 \\ 1 & -6 & 0 \end{bmatrix} \quad C = \begin{bmatrix} 5 & 3 & -1 \\ -3 & 0 & 6 \end{bmatrix}$$

$$3. \quad *B + A$$

$$4. \quad *C + B$$

#5 – 6. Find the values of the variables.

$$5. \quad * \begin{bmatrix} 4 - m & 0 \\ 8 & -28 \end{bmatrix} = \begin{bmatrix} -5 & 0 \\ 8 & -5m + 2 \end{bmatrix}$$

$$6. \quad * \begin{bmatrix} -5 & 2x + 1 \\ 6 - y & 12 \end{bmatrix} = \begin{bmatrix} -5 & 0 \\ 8 & 12 \end{bmatrix}$$

#7 – 8. Solve the matrix equation.

$$7. \quad *X - \begin{bmatrix} 2 & 1 & 8 \\ 3 & 3 & 0 \end{bmatrix} = \begin{bmatrix} 6 & -1 & -6 \\ -5 & 2 & -4 \end{bmatrix}$$

$$8. \quad * \begin{bmatrix} 5 & -7 \\ 1 & 9 \end{bmatrix} + X = \begin{bmatrix} 4 & 4 \\ 7 & 5 \end{bmatrix}$$

$$9. \quad * \text{Find } -4A + 6B.$$

$$A = \begin{bmatrix} 1 & -1 \\ 0 & -3 \\ 5 & 2 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 1 \\ 5 & 4 \\ 0 & -7 \end{bmatrix}$$

#10 – 11. Solve the matrix equation using an inverse matrix & the graphing calculator.

$$10. \quad * \begin{bmatrix} 4 & 1 & 0 \\ 9 & 2 & 1 \\ -4 & -1 & -1 \end{bmatrix} X = \begin{bmatrix} -3 \\ -4 \\ -4 \end{bmatrix}$$

$$11. \quad * \begin{bmatrix} 4 & 1 & 0 \\ 9 & 2 & 1 \\ -4 & -1 & -1 \end{bmatrix} X = \begin{bmatrix} 0 \\ -1 \\ -1 \end{bmatrix}$$

12 – 14. Write the matrix equation and use a graphing calculator to solve the following systems of equations.

$$12. \quad * \begin{cases} 3x - 2y - 3z = 25 \\ -2x - 2y + 3z = -25 \\ 3x - 5y - 4z = 27 \end{cases}$$

$$13. \quad * \begin{cases} 2w + 2x - 2y = 2 \\ 2w + 2x - 2y + 3z = 14 \\ -3w + 3x - 3y + 2z = -19 \\ w - x + y - 2z = 1 \end{cases}$$

$$14. \quad * \begin{cases} -x + 6y = -2 \\ x - 5y = 1 \end{cases}$$

Find the product.

15. $-3 \begin{bmatrix} 7 & -4 & 0 \\ -3 & 0 & 5 \\ 6 & 2 & 1 \end{bmatrix}$

#16 – 18. Determine whether the product is defined or undefined. If defined, give the dimensions of the answer matrix and find the product.

16. $\begin{bmatrix} 9 & 4 & -4 \end{bmatrix} \begin{bmatrix} 8 \\ -7 \\ -8 \end{bmatrix}$

17. $\begin{bmatrix} -8 & 4 \\ 3 & 0 \end{bmatrix} \begin{bmatrix} 5 & -6 \\ -6 & 8 \end{bmatrix}$

18. $\begin{bmatrix} 8 & -2 \\ -3 & 3 \end{bmatrix} \begin{bmatrix} -8 & 7 \\ 7 & 0 \end{bmatrix}$

#19 – 20. Solve the matrix equation using an inverse matrix.

19. $\begin{bmatrix} 9 & 32 \\ 2 & 7 \end{bmatrix} X = \begin{bmatrix} -4 \\ 9 \end{bmatrix}$

20. $\begin{bmatrix} 9 & 4 \\ 2 & 1 \end{bmatrix} X = \begin{bmatrix} 4 \\ -8 \end{bmatrix}$

#21 – 24. Evaluate the determinant of the matrix.

21. $\begin{bmatrix} -8 & -9 \\ -5 & -7 \end{bmatrix}$

22. $\begin{bmatrix} -2 & -6 \\ -6 & 6 \end{bmatrix}$

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

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

#25 – 26. Determine whether the matrix has an inverse. If the inverse exists, find it.

25. $\begin{bmatrix} 2 & 1.5 \\ -3 & -2 \end{bmatrix}$

26. $\begin{bmatrix} -2.5 & -1 \\ 1 & 0 \end{bmatrix}$

#27 – 28. Use the elimination method to solve the system BY HAND. You MUST show your work!

27.
$$\begin{cases} 2x + 4y + 2z = -4 \\ 2x + y - z = -7 \\ -5x - 3y - 5z = 3 \end{cases}$$

28.
$$\begin{cases} -2x - 2y - 4z = 0 \\ 2x - 5y + 5z = 8 \\ -2x - 2y - 2z = 2 \end{cases}$$

29. A gem store sells beads made of amber and quartz. For 2 amber beads and 1 quartz bead, the cost is \$21.50. For 4 amber beads and 1 quartz bead, the cost is \$40.50. **Write a system of equations and use matrices to find the price of each type of bead.**

You may use a calculator to help w/ the numbers, but you must show ALL work!

Write a system of equations for the following word problem. DO NOT SOLVE!!!

30. Ellen decided to bring some cookies to school for her Algebra class. She needs 24 cookies total. She buys sugar cookies for \$0.25 each, chocolate chip cookies for \$0.50 each and some snickerdoodles for \$0.30 each. She knows snickerdoodles are the most popular, so she needs twice as many snickerdoodles as sugar cookies. If she spends a total of \$8.75 on cookies, how many of each kind did she buy?

Use Gaussian elimination to transform the following systems into triangular form.

31.
$$\begin{cases} 4x - y + z = 3 \\ x + 2y + z = 0 \\ 3x + 7y - 3z = 6 \end{cases}$$

32.
$$\begin{cases} x - 3y + z = 4 \\ 2x - 8y + 8z = -2 \\ -6x + 3y - 15z = 9 \end{cases}$$