

## Algebra II 2016 Ch. 3.5 – 3.8 Test Review

### 3.5 Matrix Basics and Addition, Subtraction and Scalar Multiplication – Four Function Calc

1. What are the dimensions of A? What are the dimensions of B?

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

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

$a_{23} =$  \_\_\_\_\_

address of -4 in matrix B = \_\_\_\_\_

2. If  $C = \begin{bmatrix} -2 & -3 & 4 \\ 1 & 2 & -1 \\ 0 & -7 & -5 \end{bmatrix}$  and  $D = \begin{bmatrix} 1 & -6 & 3 \\ -2 & 3 & 8 \\ 5 & 2 & 0 \end{bmatrix}$ , find  $C - D$ .

3. If  $K = \begin{bmatrix} -2 & 0 & 7 \\ 10 & 4 & -1 \end{bmatrix}$  and  $S = \begin{bmatrix} 5 & 6 \\ 16 & -2 \\ 1 & 4 \end{bmatrix}$ , find  $K + S$

4. If  $M = \begin{bmatrix} 3 & 2 \\ -6 & 4 \\ -1 & -5 \end{bmatrix}$  Evaluate the expression  $3M$

5. If  $C = \begin{bmatrix} -1 & 8 \\ 2 & 3 \end{bmatrix}$  and  $D = \begin{bmatrix} -3 & -6 \\ 8 & 1 \end{bmatrix}$ , find  $3D - 2C$ .

### 3.6 Matrix Multiplication – Four Function Calculator

1. Given  $A = \begin{bmatrix} 3 \\ 4 \\ -2 \end{bmatrix}$  and  $B = [2 \ -1 \ 0]$ , evaluate  $AB$  and  $BA$ .

2. Evaluate the matrix expressions  $CD$  and  $DC$ .

$$C = \begin{bmatrix} 6 \\ -2 \\ -5 \end{bmatrix} \quad D = \begin{bmatrix} 3 & -2 & 1 \\ -6 & 2 & 0 \end{bmatrix}$$

3. A car lot has four sales associates. At the end of the year, each sales associate gets a bonus of \$1000 for every new car they have sold and \$500 for every used car they have sold.

a. Write a matrix for the number of each type of car each sales associate sold this year.

Cars Sold by Each Associate		
Sales Associate	New Cars	Used Cars
Mason	27	49
Westin	35	36
Gallagher	9	56
Stadler	15	62

b. Then write a bonus amount matrix.

c. Use matrix multiplication to find the total bonus each sales associate earned. Label the rows and columns of the new matrix.

### 3.8 Part 1 Matrix Inverses – Four Function Calculator

Determine whether the matrices in each pair are inverses of each other.

1.  $\begin{bmatrix} 7 & 2 \\ 17 & 5 \end{bmatrix}$  and  $\begin{bmatrix} 5 & -2 \\ -17 & 7 \end{bmatrix}$

2.  $\begin{bmatrix} 3 & 2 \\ 4 & -6 \end{bmatrix}$  and  $\begin{bmatrix} 3 & 2 \\ -4 & -3 \end{bmatrix}$

3.  $\begin{bmatrix} 5 & 2 \\ 11 & 4 \end{bmatrix}$  and  $\begin{bmatrix} -2 & 1 \\ \frac{11}{2} & -\frac{5}{2} \end{bmatrix}$

Find the inverse of the given matrix.

$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$	$\det A = ad - bc$	Inverse of A:	$A^{-1} = \frac{1}{\det A} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$
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4.  $\begin{bmatrix} 5 & 8 \\ 4 & 6 \end{bmatrix}$

5.  $\begin{bmatrix} 4 & 3 \\ 7 & 5 \end{bmatrix}$

6.  $\begin{bmatrix} 5 & -10 \\ 3 & -6 \end{bmatrix}$

7. If  $A = \begin{bmatrix} 2 & -3 \\ -1 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} x \\ y \end{bmatrix}$  find  $AB$

8. If  $A = \begin{bmatrix} 5 & -8 \end{bmatrix}$  and  $B = \begin{bmatrix} x \\ y \end{bmatrix}$  find  $AB$

### 3.8 Part 2 – Systems with matrices – Graphing Calculators Allowed

For each system, write out the matrix equation and then solve. Don't forget to put each equation in standard form first!

1. 
$$\begin{cases} 5x = 8 + 3y \\ 6x - 4 = 5y \end{cases}$$

Matrix Equation: \_\_\_\_\_

Solution: \_\_\_\_\_

2. 
$$\begin{cases} 5y = -4x \\ 5x + 3y = 13 \end{cases}$$

Matrix Equation: \_\_\_\_\_

Solution: \_\_\_\_\_

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

Matrix Equation: \_\_\_\_\_

Solution: \_\_\_\_\_

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

Matrix Equation: \_\_\_\_\_

Solution: \_\_\_\_\_

5. Keith paid \$39 for 3 pounds of pistachios and 2 pounds of cashews. Tracey paid \$23 for 2 pounds of pistachios and 1 pound of cashews. How much does a pound of each type of nut cost?
- Write a system of equations.  
Let  $x$  = the cost of a pound of pistachios,  
and  $y$  = the cost of a pound of cashews.
  - Write the matrix equation & solve for the cost of each type of nut.  
**Remember to write your solution in word.**

Matrix Equation: \_\_\_\_\_

Solution: \_\_\_\_\_

Interpretation:

6. Frank and Juanita sold tickets for the charity fund-raiser. They sold both single tickets and 5-ticket books. Write the appropriate matrix equation and find the price of a single ticket and a book of tickets.

<b>Fund-Raiser Tickets Sold</b>			
	<b>Single</b>	<b>Book</b>	<b>Total Sales</b>
<b>Frank</b>	12	4	70
<b>Juanita</b>	8	3	50

7. Theo paid \$89 for 3 T-shirts, a sweatshirt, and a jacket. Andre paid \$49 for 2 T-Shirts and a jacket. Jordan paid \$68 for 1 T-shirt and 2 sweatshirts. What is the price for each T-Shirt, sweatshirt and Jackets?