

12 REVIEW – Matrices (part 1)**NO GRAPHING CALCULATOR**Solve for x and y .

$$1) \begin{bmatrix} 2 & -1 \\ 8 & -4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -3 & 21 \\ 11 & y \end{bmatrix}$$

$$\begin{array}{l|l} 2x - (-1) = 21 & -8 - 0 = y \\ 2x + 1 = 21 & -8 = y \\ 2x = 20 & \\ x = 10 & \end{array}$$

$$\begin{bmatrix} 2x & xy \\ -7x & 5x \end{bmatrix} \cdot \begin{bmatrix} 2 & 3 \\ 7 & 19 \end{bmatrix} = \begin{bmatrix} x & 3 \\ 21 & 9 \end{bmatrix}$$

$$2) x \begin{bmatrix} 2 & y \\ -7 & 5 \end{bmatrix} + \begin{bmatrix} 2 & 3 \\ 7 & 19 \end{bmatrix} = \begin{bmatrix} x & 3 \\ 21 & 9 \end{bmatrix}$$

$$\begin{array}{l|l} -7x + 7 = 21 & xy + 3 = 3 \\ -7x = 14 & (-2)y + 3 = 3 \\ x = -2 & -2y = 0 \\ & y = 0 \end{array}$$

The dimensions of Matrix A and Matrix B are listed. What are the dimensions of the product of AB ? If it is not possible, then write "undefined."

Find the product of the two matrices. SHOW YOUR WORK.

$$3) \text{ Matrix } A: 1 \times 7$$

$$\text{Matrix } B: 1 \times 7$$

$$\text{Matrix } AB: \text{undefined}$$

$$4) \text{ Matrix } A: 3 \times 4$$

$$\text{Matrix } B: 4 \times 2$$

$$\text{Matrix } AB: 3 \times 2$$

$$5) \begin{bmatrix} -1 & -4 \\ 5 & -3 \end{bmatrix} \begin{bmatrix} 1 & 1 & 1 \\ 4 & 3 & 1 \end{bmatrix} = \begin{bmatrix} c_{1,1} & c_{1,2} & c_{1,3} \\ c_{2,1} & c_{2,2} & c_{2,3} \end{bmatrix} = \begin{bmatrix} -17 & -13 & -5 \\ -7 & -4 & 2 \end{bmatrix}$$

$$\begin{array}{l|l|l} c_{1,1} = -1(1) + -4(4) & c_{1,2} = -1(1) + -4(3) & c_{1,3} = -1(1) + -4(1) \\ = -1 - 16 & = -1 - 12 & = -1 - 4 \\ = -17 & = -13 & = -5 \\ c_{2,1} = 5(1) + -3(4) & c_{2,2} = 5(1) + -3(3) & c_{2,3} = 5(1) + -3(1) \\ = 5 - 12 & = 5 - 9 & = 5 - 3 \\ = -7 & = -4 & = 2 \end{array}$$

For 6-7, solve for the variables x and y . SHOW YOUR WORK!

$$6) \begin{bmatrix} -1 & -1 \\ 4 & x \end{bmatrix} \cdot \begin{bmatrix} y & 4 \\ -6 & -2 \end{bmatrix} = \begin{bmatrix} 12 & -2 \\ -36 & 12 \end{bmatrix}$$

$$\begin{array}{l|l} -1(y) + -1(-6) = 12 & 4(y) + x(-2) = 12 \\ -y + 6 = 12 & 4y - 2x = 12 \\ -y = 6 & 16 - 2x = 12 \\ y = -6 & -2x = -4 \\ & x = 2 \end{array}$$

$$7) \begin{bmatrix} -6 & y \\ 2 & 5 \end{bmatrix} \cdot \begin{bmatrix} x & 4 \\ 2 & 5 \end{bmatrix} = \begin{bmatrix} -34 & -49 \end{bmatrix}$$

$$\begin{array}{l|l} -6(4) + y(5) = -49 & -6(x) + -5(2) = -34 \\ -24 + 5y = -49 & -6x - 10 = -34 \\ 5y = -25 & -6x = -24 \\ y = -5 & x = 4 \end{array}$$

Algebra 2 – Unit 12

Name: _____ Date: _____ Period: _____

ID: 1

12 REVIEW – Matrices

Simplify. Write "undefined" for expressions that are undefined.

<p>8) $[-6 \ -1 \ 4 \ 5] + [1 \ 3 \ -6 \ -4]$</p> $= [-5 \ 2 \ -2 \ 1]$	<p>9) $\begin{bmatrix} -2 & -3 \\ 6 & -4 \\ 3 & 0 \end{bmatrix} + \begin{bmatrix} 2 & 4 \\ -4 & -5 \\ -6 & 4 \end{bmatrix} + \begin{bmatrix} -2 & -1 \\ 1 & 4 \\ 6 & -5 \end{bmatrix}$</p> $= \begin{bmatrix} -2 & 0 \\ 3 & -5 \\ 3 & -1 \end{bmatrix}$
--	--

<p>10) $[-3 \ -4 \ 4] - ([6 \ -2 \ -3] - [-1 \ 2 \ -5])$</p> $[-3 \ -4 \ 4] + [-6 \ 2 \ 3] + [-1 \ 2 \ -5]$ $= [-10 \ 0 \ 2]$	<p>11) Solve: $C + \begin{bmatrix} -9 \\ -9 \\ -6 \end{bmatrix} = \begin{bmatrix} -9 \\ -7 \\ 4 \end{bmatrix}$</p> $C = \begin{bmatrix} -9 \\ -9 \\ 4 \end{bmatrix} + \begin{bmatrix} 9 \\ 9 \\ 6 \end{bmatrix}$ $C = \begin{bmatrix} 0 \\ 0 \\ 10 \end{bmatrix}$
--	--

<p>12) Solve: $-2B + \begin{bmatrix} -1 \\ 9 \\ 7 \end{bmatrix} = \begin{bmatrix} 13 \\ -5 \\ -3 \end{bmatrix}$</p> $-2B = \begin{bmatrix} 13 \\ -5 \\ -3 \end{bmatrix} + \begin{bmatrix} 1 \\ -9 \\ -7 \end{bmatrix}$ $-2B = \begin{bmatrix} 14 \\ -14 \\ -10 \end{bmatrix}$ $B = \begin{bmatrix} -7 \\ 7 \\ 5 \end{bmatrix}$	<p>13) Find the inverse of the 2x2 matrix. Show your work.</p> $\begin{bmatrix} -5 & 8 \\ -4 & 6 \end{bmatrix}^{-1} = \frac{1}{-5(6) - (-4)(8)} \begin{bmatrix} 6 & -8 \\ 4 & -5 \end{bmatrix}$ $= \frac{1}{-30 + 32} \begin{bmatrix} 6 & -8 \\ 4 & -5 \end{bmatrix}$ $= \frac{1}{2} \begin{bmatrix} 6 & -8 \\ 4 & -5 \end{bmatrix}$ $= \begin{bmatrix} 3 & -4 \\ 2 & -5/2 \end{bmatrix}$
---	---

Part 2

Graphing Calculator Allowed

14) Solve the matrix equation with a graphing calculator.

$$\begin{bmatrix} 1 & -4 \\ 3 & -8 \end{bmatrix} X = \begin{bmatrix} -7 \\ -5 \end{bmatrix}$$

$$X = \begin{bmatrix} 1 & -4 \\ 3 & -8 \end{bmatrix}^{-1} \begin{bmatrix} -7 \\ -5 \end{bmatrix}$$

$$X = \begin{bmatrix} 9 \\ 4 \end{bmatrix}$$

Part 2

15) Solve the system using a matrix equation. Set up the matrices in the space below, then use a calculator to solve it.

$$z = -3x + 3y + 11 \Rightarrow 3x - 3y + z = 11$$

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

$$-2x + 2y - 6z = 30$$

Graphing Calculator Allowed

$$\begin{bmatrix} 3 & -3 & 1 \\ -3 & 7 & -7 \\ -2 & 2 & -6 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 11 \\ 3 \\ 30 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 & -3 & 1 \\ -3 & 7 & -7 \\ -2 & 2 & -6 \end{bmatrix}^{-1} \begin{bmatrix} 11 \\ 3 \\ 30 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -1 \\ -7 \\ -7 \end{bmatrix}$$