

Name _____

Date _____

Advanced Algebra

Unit 6: Advanced Systems "Undoing" a Matrix

Unit 6 Assignment #10

Matrix Multiplication and solving systems of equations with elimination

Learning Target: I can "undo" a matrix using matrix multiplication and then solving systems of equations using elimination. **Show the systems of 2 equations and 2 unknowns and the work to solve!**

$$1) \begin{bmatrix} 3 & 2 \\ 1 & 5 \end{bmatrix} * \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 7 & 18 \\ 21 & 32 \end{bmatrix}$$

$$3a + 2c = 7$$

$$3a + 5c = 21 \quad (-3)$$

$$3a + 2c = 7$$

$$\underline{-3a - 15c = -63}$$

$$-13c = -56$$

$$c = 4.3$$

$$a = -.53$$

$$3b + 2d = 18$$

$$10 + 5d = 32 \quad (-3)$$

$$3b + 2d = 18$$

$$\underline{-3b - 15d = -96}$$

$$-13d = -78$$

$$d = 6$$

$$b = 2$$

$$a = \underline{-.53} \quad b = \underline{2}$$

$$c = \underline{4.3} \quad d = \underline{6}$$

$$2) \begin{bmatrix} 2 & 6 \\ 1 & 4 \end{bmatrix} * \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 18 & 28 \\ 12 & 18 \end{bmatrix}$$

$$2a + 6c = 18$$

$$a + 4c = 12 \quad (-2)$$

$$2a + 6c = 18$$

$$\underline{-2a - 8c = -24}$$

$$-2c = -6$$

$$c = 3$$

$$a = 0$$

$$2b + 6d = 28$$

$$10 + 4d = 18 \quad (-2)$$

$$2b + 6d = 28$$

$$\underline{-2b - 8d = -36}$$

$$-2d = -8$$

$$d = 4$$

$$a = \underline{0} \quad b = \underline{2}$$

$$c = \underline{3} \quad d = \underline{4}$$

$$3) \begin{bmatrix} 6 & 2 \\ 1 & 3 \end{bmatrix} * \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} -18 & 32 \\ -11 & 10 \end{bmatrix}$$

$$6a + 2c = -18$$

$$a + 3c = -11 \quad (6)$$

$$6b + 2d = 32$$

$$b + 3d = 10 \quad (6)$$

$$\begin{array}{r} 6a + 2c = -18 \\ -6a + 18c = +66 \\ \hline -16c = 48 \end{array}$$

$$\begin{array}{r} 6b + 2d = 32 \\ -6b + 18d = 60 \\ \hline -16d = -28 \end{array}$$

$$\boxed{c = -3}$$

$$-16d = -28$$

$$d = 1.75$$

$$a = -2$$

a = <u>-2</u>	b = <u>4.75</u>
c = <u>-3</u>	d = <u>1.75</u>

$$4) \begin{bmatrix} 2 & 6 \\ 4 & 1 \end{bmatrix} * \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 22 & 16 \\ 22 & 21 \end{bmatrix}$$

$$2a + 6c = 22$$

$$4a + c = 22$$

$$4a + 12c = 44$$

$$-4a - c = -22$$

$$\hline 11c = 22$$

$$\boxed{c = 2}$$

$$2b + 6d = 16 \quad (-2)$$

$$4b + d = 21$$

$$-4b - 12d = -32$$

$$4b + d = 21$$

$$\hline -11d = -11$$

$$\boxed{d = 1}$$

a = <u>5</u>	b = <u>5</u>
c = <u>2</u>	d = <u>1</u>