6.3H Matrices on Steroids

SHOW YOUR WORK FOR FULL CREDIT. NO WORK IN PEN.

List the multiplicative inverse of the numbers below.

1. $\frac{1}{6} =$
2. $3\frac{1}{2} =$
3. $-\frac{3}{2} =$
4. $4.35 =$

5. Why are your answers called the multiplicative inverse?

Write each of the following systems as an **augmented matrix** and solve using **row echelon reduction**.

6. $\begin{cases} -2x = 3 \\ -y + 3x - 5 = 0 \end{cases}$

7. $\begin{cases} 6x + 3y = 2 + -4y \\ 3y - \frac{1}{2}x = -\frac{5}{2}x - 2 \end{cases}$

Write numbers 6 and 7 as **matrix equations**.

8.

9.

An inverse matrix multiplied by the original matrix results in the matrix $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$. Multiply the matrices below to find the **inverse matrices** $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$. The coefficients of x and y in #1 and #2 are the missing numbers below.

10. $\begin{bmatrix} & \\ & \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.

11. $\begin{bmatrix} & \\ & \end{bmatrix} \begin{bmatrix} a & b \\ c & d \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

12. What is a common factor of all of your values in the inverse matrix for #5? _____

13. What is a common factor of all of your values in the inverse matrix for #6? _____

Factor out that number from each of the inverse matrices.

14. .   15.

16. What do you notice about the matrix after you factored?

Write and solve the system using **AUGMENTED MATRICES & ROW ECHELON REDUCTION**.

17. Kobe Byrant scored 22 times during one game. He scored a total of 35 points, two for each field goal shot and one for each free throw (no 3-point shots). How many of each kind of shot did he make?

18. Kara purchases 18 sets of hardware and 3 sheets of plywood for a skateboard ramp. Her friend purchases 5 sets of hardware and 5 sheets of plywood for a bike jump. If Kara spent $91.50 and her friend spent $65.00. How much the sets of hardware cost and how much the sheets of plywood cost?

19. Hailey is saving dimes and quarters. She has 94 coins in all, and the total value is $19.30. How many dimes and how many quarters does she have?

Fill in the missing values in the matrices below.

20. $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}\begin{bmatrix} 2 & 0 \\ 1 & \end{bmatrix} = \begin{bmatrix} 4 & 4 \\ & 8 \end{bmatrix}$

21. $\begin{bmatrix} 1 & 3 \\ 4 & \end{bmatrix}\begin{bmatrix} & 3 \\ 2 & \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ & 14 \end{bmatrix}$

22. $\begin{bmatrix} & 0 \\ -1 & \end{bmatrix}\begin{bmatrix} 2 & -3 \\ & 8 \end{bmatrix} = \begin{bmatrix} 2 & \\ 3 & 28 \end{bmatrix}$

23. $\begin{bmatrix} 2 & 3 & -1 \\ 6 & & -2 \end{bmatrix}\begin{bmatrix} 4 & -5 \\ -3 & \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 19 & \\ & -35 \end{bmatrix}$