H Alg2/Trig Ch12 WS

Name:

$$A = \begin{bmatrix} 1 & 1 & 3 \\ -2 & 3 & 2 \end{bmatrix}$$

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

$$C = \begin{bmatrix} 2 & 1 \\ 1 & 3 \\ -1 & 2 \end{bmatrix}$$

1. $AC =$

2. $A - B =$

3. Consider matrix A. What result if $R_1 = -2r_2 + r_1$?

4. Solve for x:

$$\begin{vmatrix} 1 & 1 & 0 \\ x & 1 & 1 \\ 1 & 0 & 1 \end{vmatrix} = 3$$

5. Use Cramer's Rule to solve the system of equations:

$$\begin{aligned} 4x + y &= 10 \\ 6x + 2y &= 14 \end{aligned}$$

   (a) $D =$

   (b) $D_x =$

   (c) $D_y =$

   (d) $x =$

   (e) $y =$

6. Multiply
$$\begin{bmatrix} 4 & 1 \\ 6 & 2 \end{bmatrix} \begin{bmatrix} 1 & -\frac{1}{2} \\ -3 & 2 \end{bmatrix}$$

Did you get the identity matrix? Good! That's because
$$\begin{bmatrix} 1 & -\frac{1}{2} \\ -3 & 2 \end{bmatrix}$$
is the inverse matrix of
$$\begin{bmatrix} 4 & 1 \\ 6 & 2 \end{bmatrix}$$

7. Multiply
$$\begin{bmatrix} 1 & -\frac{1}{2} \\ -3 & 2 \end{bmatrix} \begin{bmatrix} 10 \\ 14 \end{bmatrix}$$

Did you get a matrix that matched the answer you found in question 5, parts (d) and (e)? Good! We can solve a system of equations by multiplying the inverse matrix to the answer column.

8. This is how to find the inverse of
$$\begin{bmatrix} 4 & 1 \\ 6 & 2 \end{bmatrix}$$

   (a) swap the top left with the bottom right:
   $$\begin{bmatrix} 2 & 1 \\ 6 & 4 \end{bmatrix}$$

   (b) change the sign of the top right and bottom left:
   $$\begin{bmatrix} 2 & -1 \\ -6 & 4 \end{bmatrix}$$

   (c) now multiply by the reciprocal of the determinate (Since the determinate of the original matrix is 2, we multiply by 1/2):
   $$\frac{1}{2}\begin{bmatrix} 2 & -1 \\ -6 & 4 \end{bmatrix} = \begin{bmatrix} 1 & -\frac{1}{2} \\ -3 & 2 \end{bmatrix}$$

9. Follow the 3 steps of number 8 to find the inverse of $\begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$

10. Now Solve
$$\begin{aligned} 2x + 5y &= 9 \\ 3x + 8y &= 4 \end{aligned}$$
by multiplying the inverse matrix you found in question 9 with $\begin{bmatrix} 9 \\ 4 \end{bmatrix}$

11. Solve by any method (Yes, your calculator can tell you the inverse of matrix A by typing $[A]^{-1}$)
$$\begin{aligned} 4x - 6y - 12z &= -11 \\ 12x + 9y - 4z &= 9 \\ 3x + 3y - 6z &= -1 \end{aligned}$$

12. There are 200 marbles in a bag, some are blue and some are red. The blue balls weigh 2 oz. each, while the red balls weigh 2.5 oz. each. If the total weighs 29.25 pounds (468 oz), how many red balls are there?