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Key
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HansenMath Precalculus students:

As you prepare for the 7.2 - 7.5 Quiz tomorrow, here are a few things to be aware of.

- Any of the concepts/problems assigned from 7.2 → 7.5 are fair game.
- However, the attached review should serve you well as a study guide.
- You need to be acquainted with how to solve systems/matrices by hand and w/calculator utility.
- You need to understand the difference between REF, RREF, and neither.
- You need to be able to translate a basic quantity/cost story problem into a system of equations/matrix
- This quiz will be two one-sided pages.
 - Page 1 is NO Calculator. You will not be permitted to use any calculator until this is turned in.
 - Page 2 is a separate page - use may use your Calculator to its fullest benefit. 2nd Matrix, etc.
- Let's do this!

From Page 571: Solve by hand.
 Recommended to use Gaussian Elimination

$$43. \begin{cases} x - 2y + z = -6 \\ 2x - 3y = -7 \\ -x + 3y - 3z = 11 \end{cases}$$

$$\begin{matrix} (-2R_1) \\ +R_2 \end{matrix} \rightarrow \begin{cases} x - 2y + z = -6 \\ y - 2z = 5 \\ y - 2z = 5 \end{cases}$$

$$R_1 + R_3 \rightarrow \begin{cases} x - 2y + z = -6 \\ y - 2z = 5 \\ y - 2z = 5 \end{cases}$$

$$R_2 - R_3 \rightarrow \begin{cases} x - 2y + z = -6 \\ y - 2z = 5 \\ 0 = 0 \end{cases}$$

So: $z = a$

So: $y - 2a = 5 \rightarrow y = 2a + 5$

Re-write the system as an "augmented" matrix

$$67. \begin{cases} 8x - 7y + 4z = 12 \\ 3x - 5y + 2z = 20 \\ 5x + 3y - 3z = 26 \end{cases}$$

$$\left[\begin{array}{ccc|c} 8 & -7 & 4 & 12 \\ 3 & -5 & 2 & 20 \\ 5 & 3 & -3 & 26 \end{array} \right]$$

So: $x - 2(2a + 5) + a = -6 \rightarrow x = 3a + 4$
 Solution: $(3a + 4, 2a + 5, a)$

By hand, transform Matrix into row-echelon form (answers may vary):

Use calc utility to convert to RREF.

71. $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 2 & 3 \\ 2 & 2 & 2 \end{bmatrix} \xrightarrow{\text{chose to swap } R_1 \& R_2} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix} \xrightarrow{(\frac{1}{2})R_3}$

73. $\begin{bmatrix} 3 & -2 & 1 & 0 \\ 4 & -3 & 0 & 1 \end{bmatrix}$

RREF

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

$$\begin{matrix} R_1 \\ R_2 \\ R_1 - R_3 \end{matrix} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 1 \\ 0 & 1 & 2 \end{bmatrix} \rightarrow \begin{matrix} R_1 \\ R_2 \\ R_2 - R_3 \end{matrix} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 1 \\ 0 & 0 & -1 \end{bmatrix}$$

FYI: Inconsistent
No Solution

By hand, convert to a Matrix then use Gaussian Elimination to Solve.

Afterward, use Calculator and RREF to verify.

81. $\begin{cases} 2x + 3y + 3z = 3 \\ 6x + 6y + 12z = 13 \\ 12x + 9y - z = 2 \end{cases} \rightarrow \begin{bmatrix} 2 & 3 & 3 & : & 3 \\ 6 & 6 & 12 & : & 13 \\ 12 & 9 & -1 & : & 2 \end{bmatrix} \rightarrow$

$$\begin{matrix} R_1 \\ -3R_1 + R_2 \\ -2R_2 + R_3 \end{matrix} \begin{bmatrix} 2 & 3 & 3 & : & 3 \\ 0 & -3 & 3 & : & 4 \\ 0 & -3 & -25 & : & -24 \end{bmatrix} \rightarrow \begin{matrix} R_1 \\ R_2 \\ R_2 - R_3 \end{matrix} \begin{bmatrix} 2 & 3 & 3 & : & 3 \\ 0 & -3 & 3 & : & 4 \\ 0 & 0 & 28 & : & 28 \end{bmatrix} \rightarrow$$

$$\begin{matrix} R_1 \\ R_2 \\ \frac{1}{28}R_3 \end{matrix} \begin{bmatrix} 2 & 3 & 3 & : & 3 \\ 0 & -3 & 3 & : & 4 \\ 0 & 0 & 1 & : & 1 \end{bmatrix} \rightarrow \boxed{z=1} \text{ so: } -3y + 3(1) = 4 \text{ so: } 2x + 3(-\frac{1}{3}) + 3(1) = 3$$

$$\boxed{y = -\frac{1}{3}} \quad \text{so: } 2x - 1 + 3 = 3 \quad \boxed{x = \frac{1}{2}}$$

By hand, multiply to find AB, BA, and A²
Afterward, use Calculator to confirm answers.

113. $A = \begin{bmatrix} 3 & -2 & 0 \\ 1 & 4 & 9 \end{bmatrix} \quad B = \begin{bmatrix} 7 & 0 \\ 5 & 3 \\ -1 & 3 \end{bmatrix}$

$$AB = \begin{bmatrix} 21-10+0 & 0-6+0 \\ 7+20-9 & 0+12+27 \end{bmatrix} \rightarrow \begin{bmatrix} 11 & -6 \\ 18 & 39 \end{bmatrix}$$

Solutions: $(\frac{1}{2}, -\frac{1}{3}, 1)$

$$BA = \begin{bmatrix} 21+0 & -14+0 & 0+0 \\ 15+3 & -10+12 & 0+27 \\ -3+3 & 2+12 & 0+27 \end{bmatrix} \rightarrow \begin{bmatrix} 21 & -14 & 0 \\ 18 & 2 & 27 \\ 0 & 14 & 27 \end{bmatrix}$$

* A² Not Defined