100	90's	80's	70's	60's	<60
0	2	9	1	1	3

Assessment 1
Dusty Wilson
Math 220

mean = 78.7%
median = 83.8%

No work = no credit
No Calculators

Name: key

We must admit with humility that, while number is purely a product of our minds, space has a reality outside our minds, so that we cannot completely prescribe its properties a priori.

Johann Carl Friedrich Gauss
1777 - 1855 (German mathematician)

Warm-ups (1 pt each): $-3^2 =$ -9 $\quad 1-(-1) =$ 2 $\quad$ When did Gauss die? = 1855

1.) (1 pt) According to Gauss (above), were numbers discovered or invented? Answer using complete English sentences.

Numbers are a product of our mind which leads me to think he believed they are invented.

2.) (1 pt) Slack hint: The number is 12

3.) (4 pts) Solve the system $\begin{array}{rrcr} 4x_1 & +5x_2 & = & -7 \\ 3x_1 & -2x_2 & = & 12 \end{array}$ using matrix methods.

$$\begin{bmatrix} 4 & 5 & -7 \\ 3 & -2 & 12 \end{bmatrix} \quad R_1 - R_2 \to R_1$$

$$\sim \begin{bmatrix} 1 & 7 & -19 \\ 3 & -2 & 12 \end{bmatrix} \quad R_2 - 3R_1 \to R_2$$

$$\sim \begin{bmatrix} 1 & 7 & -19 \\ 0 & -23 & 69 \end{bmatrix} \quad -\frac{1}{23}R_2 \to R_2$$

$$\sim \begin{bmatrix} 1 & 7 & -19 \\ 0 & 1 & -3 \end{bmatrix} \quad R_1 - 7R_2 \to R_1$$

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

$x_1 = 2$ and $x_2 = -3$

4.) (2 pts) Determine the value(s) of h such that the matrix $\begin{bmatrix} 1 & 3 & -2 \\ -4 & h & 8 \end{bmatrix}$ is the augmented matrix of a consistent linear system.

$R_2 + 4R_1 \to R_2$

$$\sim \begin{bmatrix} 1 & 3 & -2 \\ 0 & h+12 & 0 \end{bmatrix}$$

since this will never be 0 = not zero
h can be any real number.

5.) (2 pts) Give an example of a 3x4 augmented matrix of an inconsistent linear system.

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 0 & 5 & 6 & 7 \\ 0 & 0 & 0 & 8 \end{bmatrix} \leftarrow \quad 0 = 8$$

6.) (4 pts) Solve the system $\begin{aligned} x_1 \quad -3x_2 \qquad\quad &= 5 \\ -x_1 \quad + x_2 \quad +5x_3 &= 2 \\ 3x_2 \qquad\quad &= 3 \end{aligned}$ using matrix methods.

$$\begin{bmatrix} 1 & -3 & 0 & 5 \\ -1 & 1 & 5 & 2 \\ 0 & 3 & 0 & -3 \end{bmatrix} \quad R_2 + R_1 \rightarrow R_2$$

$$\sim \begin{bmatrix} 1 & -3 & 0 & 5 \\ 0 & -2 & 5 & 7 \\ 0 & 3 & 0 & -3 \end{bmatrix} \quad R_2 \leftrightarrow R_3$$

$$\sim \begin{bmatrix} 1 & -3 & 0 & 5 \\ 0 & 3 & 0 & -3 \\ 0 & -2 & 5 & 7 \end{bmatrix} \quad \frac{1}{3} R_2 \rightarrow R_2$$

$$\begin{bmatrix} 1 & -3 & 0 & 5 \\ 0 & 1 & 0 & -1 \\ 0 & -2 & 5 & 7 \end{bmatrix} \quad R_3 + 2R_2 \rightarrow R_3$$

$$\begin{bmatrix} 1 & -3 & 0 & 5 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 5 & 5 \end{bmatrix} \quad \begin{matrix} R_1 + 3R_2 \rightarrow R_1 \\ \frac{1}{5} R_3 \rightarrow R_3 \end{matrix}$$

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

$(2, -1, 1)$