

Honors Algebra 2B Final Exam Review Part 3

Hour: _____

Name: Key

Date: _____

1. Consider the system of linear equations.

$$2x - 5y + 5z = 17$$

$$-x + 3y = -4$$

$$x - 2y + 3z = 9$$

Solve by modeling the system as an augmented matrix and transforming it to reduced row echelon form.

$$R_2 + R_3 \left[\begin{array}{ccc|c} 2 & -5 & 5 & 17 \\ -1 & 3 & 0 & -4 \\ 1 & -2 & 3 & 9 \end{array} \right]$$

$$-2R_3 \left[\begin{array}{ccc|c} 2 & -5 & 5 & 17 \\ 0 & 1 & 3 & 5 \\ 1 & -2 & 3 & 9 \end{array} \right]$$

$$R_3 + R_1 \left[\begin{array}{ccc|c} 2 & -5 & 5 & 17 \\ 0 & 1 & 3 & 5 \\ -2 & 4 & -6 & -18 \end{array} \right]$$

$$R_3 + R_2 \left[\begin{array}{ccc|c} 2 & -5 & 5 & 17 \\ 0 & 1 & 3 & 5 \\ 0 & -1 & -1 & -1 \end{array} \right]$$

$$\downarrow \frac{1}{2}R_1 \left[\begin{array}{ccc|c} 2 & -5 & 5 & 17 \\ 0 & 1 & 3 & 5 \\ 0 & 0 & 2 & 4 \end{array} \right]$$

$$\frac{1}{2}R_3 \left[\begin{array}{ccc|c} 1 & -\frac{5}{2} & \frac{5}{2} & \frac{17}{2} \\ 0 & 1 & 3 & 5 \\ 0 & 0 & 1 & 2 \end{array} \right]$$

~~z=2~~

$$\begin{aligned} z &= 2 \\ y &= -1 \\ x &= 1 \end{aligned}$$

2. Place the following into an Augmented Matrix. Solve by Elementary Row Operations. Your matrix MUST finish in Row-Echelon form. Solutions without proper Elementary Row Operations work shown will not be considered for credit.

$$x - y + z = 0$$

$$2x + 2y = 7$$

$$2y + 4z = 8$$

$$\frac{1}{2}R_2 \left[\begin{array}{ccc|c} 1 & -1 & 1 & 0 \\ 2 & 2 & 0 & 7 \\ 0 & 2 & 4 & 8 \end{array} \right]$$

$$R_2 - R_1 \left[\begin{array}{ccc|c} 1 & -1 & 1 & 0 \\ 1 & 1 & 0 & 7 \\ 0 & 1 & 2 & 8 \end{array} \right]$$

$$\downarrow R_2 - 2R_3 \left[\begin{array}{ccc|c} 1 & -1 & 1 & 0 \\ 0 & 2 & -1 & 7 \\ 0 & 1 & 2 & 4 \end{array} \right]$$

$$\uparrow \left[\begin{array}{ccc|c} 1 & -1 & 1 & 0 \\ 0 & 0 & -5 & -9 \\ 0 & 1 & 2 & 4 \end{array} \right]$$

$$-\frac{1}{5}(R_3) \left[\begin{array}{ccc|c} 1 & -1 & 1 & 0 \\ 0 & 0 & 5 & 9 \\ 0 & 1 & 2 & 4 \end{array} \right]$$

$$\left[\begin{array}{ccc|c} 1 & -1 & 1 & 0 \\ 0 & 1 & 2 & 4 \\ 0 & 0 & 1 & \frac{9}{5} \end{array} \right]$$

$$\boxed{x = \frac{13}{10}, y = \frac{11}{5}, z = \frac{9}{10}}$$

Honors Algebra 2B Final Exam Review Part 3

3. Solve for X

$$2X - \begin{pmatrix} -2 & 0 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} 4 & 12 \\ 1 & -4 \end{pmatrix}$$

$$X = \begin{bmatrix} 1 & 6 \\ 2 & 0 \end{bmatrix}$$

4. Solve

$$\begin{pmatrix} 3 & -2 & 6 \\ -2 & 3 & -2 \\ 1 & 2 & -5 \end{pmatrix} \begin{pmatrix} 4 \\ 5 \\ 3 \end{pmatrix} = \begin{bmatrix} 20 \\ 1 \\ -1 \end{bmatrix}$$

5. Let $A = \begin{pmatrix} 2 & -1 & -3 \\ -4 & 0 & 5 \\ 3 & 3 & -1 \end{pmatrix}$

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

Solve:

a) $A+B = \begin{bmatrix} 1 & -4 & -1 \\ -6 & -1 & 9 \\ 5 & 6 & -2 \end{bmatrix}$

b) $AB = \begin{bmatrix} -6 & -14 & 3 \\ 14 & 27 & -13 \\ -11 & -15 & 19 \end{bmatrix}$

Honors Algebra 2B Final Exam Review Part 3

8. The Seaholm Honors Algebra 2 classes are forming a committee to see how we can make the class more enjoyable by adding more problems with fractions, graphing, and lengthening homework assignments. Given that there are 40 Honors Algebra 2 students, how many ways can a committee of 5 students be chosen?

$$\begin{aligned}
 40 C_5 &= \frac{40!}{(40-5)! 5!} = \frac{40 \cdot 39 \cdot 38 \cdot 37 \cdot 36 \cdot 35!}{35! \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} \\
 &= \frac{78960960}{120} \\
 &= 658,008
 \end{aligned}$$

9. You decide to play the Lotto. You must choose 7 numbers out of 42. How many possible combinations are there for this Lotto?

$$\begin{aligned}
 42 C_7 &= \frac{42!}{(42-7)! 7!} = \frac{42 \cdot 41 \cdot 40 \cdot 39 \cdot 38 \cdot 37 \cdot 36 \cdot 35!}{35! \cdot 7!} \\
 &= 26,978,328
 \end{aligned}$$

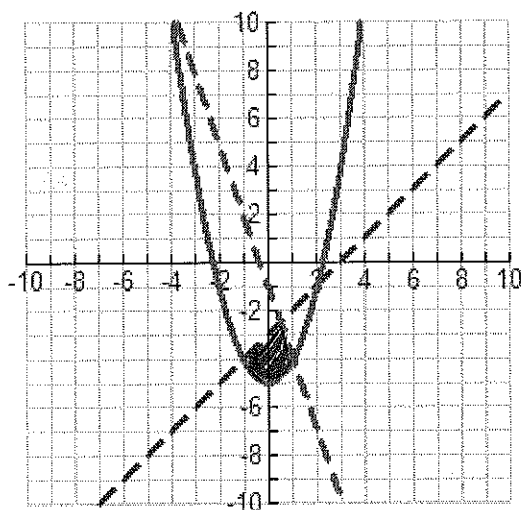
Honors Algebra 2B Final Exam Review Part 3

6. Solve the Inequalities by graphing:

$$y < x - 3$$

$$y \geq x^2 - 5$$

$$6x + 2y + 5 < 3$$



7. Mr. Caughell's daughter, Lulu, has a jar containing only nickels and dimes and it has a total of 60 coins. The value of all the coins in her jar is \$4.45. Solve to find the number of nickels and dimes she has in the jar.

$$n + d = 60$$

$$0.05n + 0.10d = 4.45$$

$$5n + 10d = 445$$

$$d = 29$$

$$n = 31$$