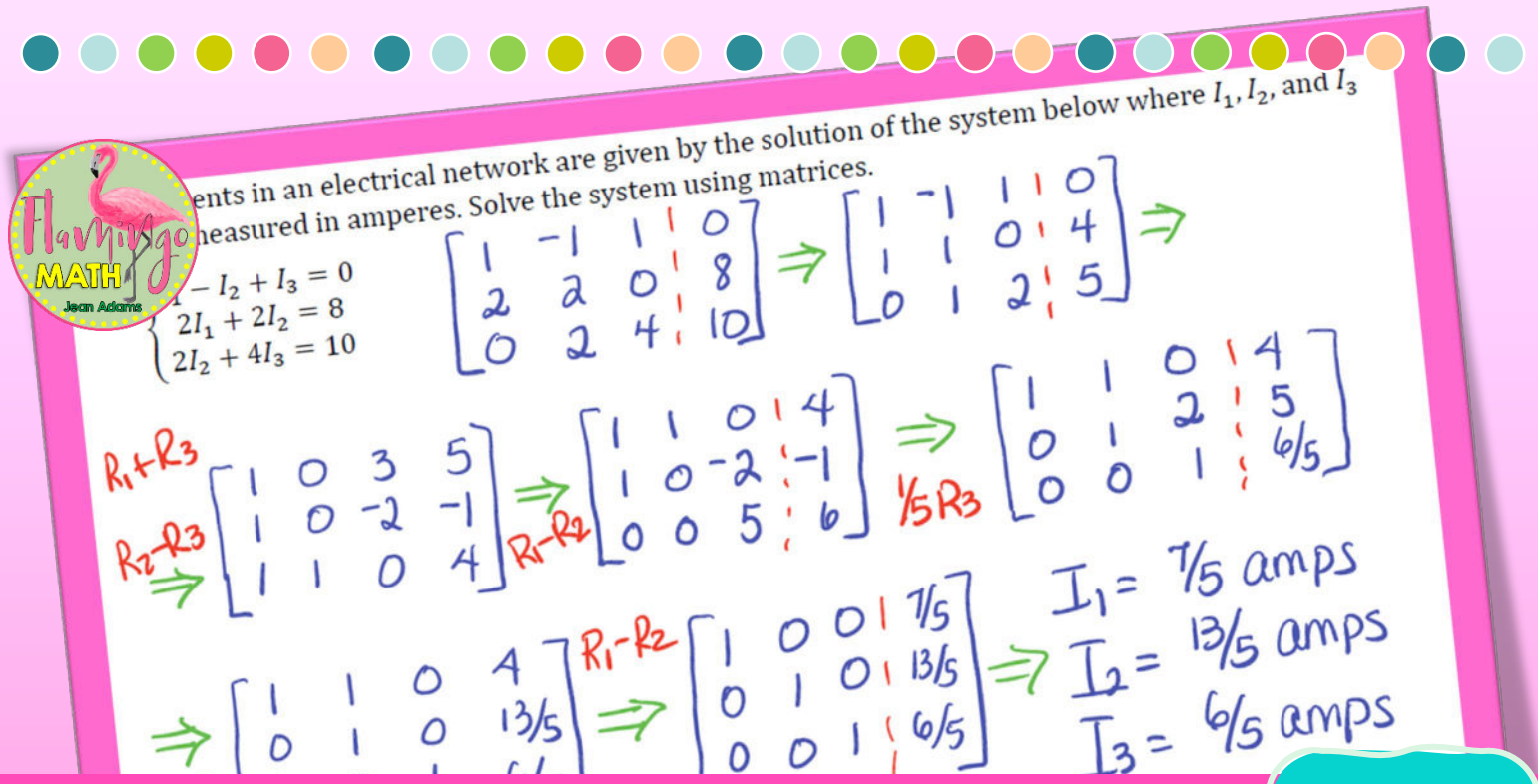
Precalculus Honors

Systems of Equations and Matrices



Homework 7

Completely Editable

PRECALCULUS CURRICULUM

Scope and Sequence

Unit 7: Systems of Equations and Matrices

Lesson	Skills & Learning Objectives
[7.1] Solving Systems of Equations	❑ Solve systems of equations in two variables by elimination method. ❑ Solve systems of three equations with three unknowns, including real-world applications.
[7.2] Multivariable Linear Systems	❑ Use back-substitution to solve linear systems in row-echelon form. ❑ Use Gaussian elimination to solve systems of linear equations. ❑ Solve non-square systems of linear equations ❑ Use systems of linear equations in three or more variables to solve real-world applications.
[7.3] Matrices and Systems of Equations	❑ Write matrices and identify their orders. ❑ Perform elementary row operations on matrices. ❑ Use matrices and Gaussian elimination to solve systems of linear equations ❑ Use matrices and Gauss-Jordan elimination to solve systems of linear equations.
[7.4] The Algebra of Matrices	❑ Determine whether two matrices are equal. ❑ Add and subtract matrices and multiply matrices by scalars. ❑ Multiple two matrices. ❑ Use matrix operations to model and solve real-world problems.
[7.5] Inverses of Matrices and Matrix Equations	❑ Verify that two matrices are inverses of each other. ❑ Use Gauss-Jordan elimination to find the inverses of matrices. ❑ Use a formula to find the inverses of matrices. ❑ Use inverse matrices to solve systems of linear equations.

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PRECALCULUS CURRICULUM

Scope and Sequence

Unit 7: Systems of Equations and Matrices

Lesson	Skills & Learning Objectives
[7.6] The Determinant of a Square Matrix	❑ Find the determinants of matrices. ❑ Find minors and cofactors of square matrices. ❑ Find the determinants of square matrices.
[7.7] Partial Fractions	❑ Recognize partial fraction decompositions of rational expressions. ❑ Find partial fraction decompositions of rational expressions.
[7.8] Systems of Nonlinear Equations	❑ Solve systems of nonlinear equations by graphing
[7.9] Linear Programming	❑ Sketch the graphs of inequalities in two variables ❑ Use linear programming to maximize and minimize real-world applications

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7.4 The Algebra of Matrices Homework

Name _____

Date _____ Period _____

Problems 1 – 4, find, if possible, (a) $A + B$, (b) $A - B$, (c) $2A$, and (d) $3A - 2B$

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

2. $A = \begin{bmatrix} 6 & 3 \\ -1 & -2 \\ 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 9 \\ 1 & -3 \\ 1 & 6 \end{bmatrix}$

3. $A = \begin{bmatrix} -2 & 1 & 0 \\ -3 & 5 & 6 \end{bmatrix}$, $B = \begin{bmatrix} 9 & -3 \\ 4 & -2 \end{bmatrix}$

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

Applications

17. A manufacturer produces three models of Bluetooth earbuds and shipped to two distribution centers. The number of units of model m that are shipped to distribution center n is represented by a_{mn} in the matrix. The price for each unit is represented by matrix B. Compute BA and state what each entry of the product represents.

$$A = \begin{bmatrix} 3{,}800 & 4{,}200 \\ 5{,}500 & 12{,}500 \\ 8{,}000 & 6{,}400 \end{bmatrix}$$

$$B = [\$42.50 \quad \$55.50 \quad \$78.50]$$

18. The costs of equipment for the track team is shown in the table at right. Each jersey costs \$25, shoes cost \$125, and warm-ups cost \$165. Use matrices to find the total cost of equipment for each team.

Equipment	Boy's Team	Girl's Team
Jersey	38	32
Track shoes	18	15
Team Warm-Up	20	17

19. The matrix below shows the inventory in a t-shirt shop. The shop owner needs to know the value of her inventory. Set up a matrix multiplication and calculate the value of the inventory.

	Small	Medium	Large
Tank tops	31	42	27
T-shirts	28	55	48
Hoodies	15	36	26

	Cost
Tank tops	\$9
T-shirts	\$12
Hoodies	\$16

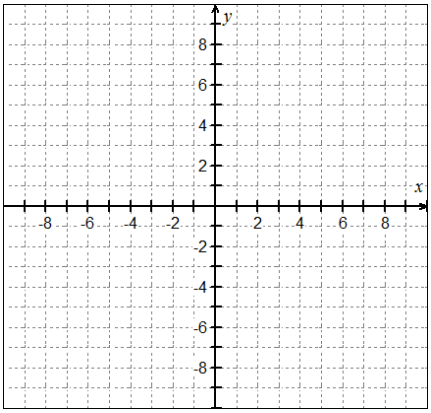
7.9 Systems of Inequalities & Linear Programming Homework

Name _____

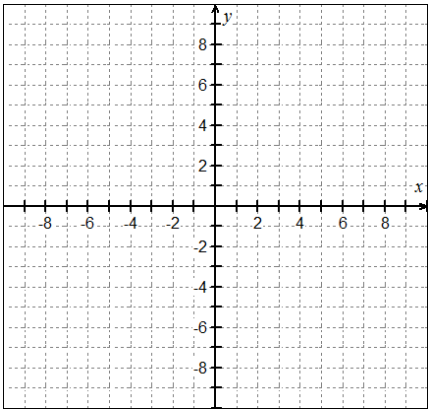
Date _____ Period _____

Problems 1 – 6, graph each system of inequalities.

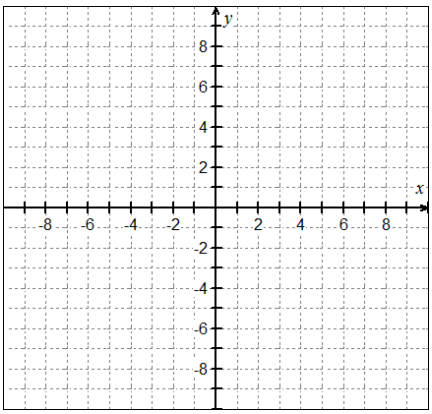
1. $\begin{cases} 4x + 3y < -6 \\ 2x - y \leq -8 \end{cases}$



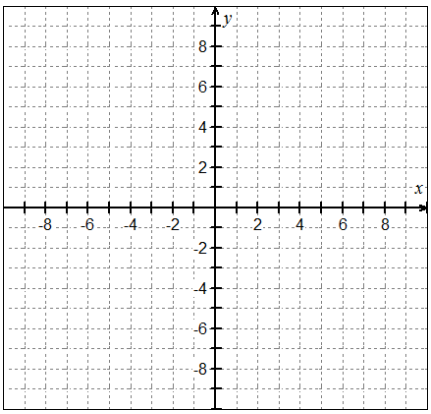
2. $\begin{cases} x^2 + y^2 \leq 25 \\ 3x - 4y \leq 0 \end{cases}$



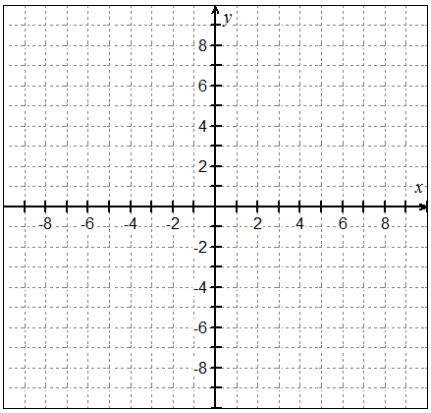
3. $\begin{cases} y < x^2 \\ x^2 + y^2 \leq 25 \end{cases}$



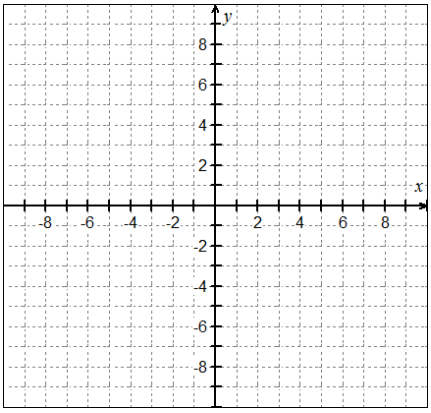
4. $\begin{cases} |x| < 2 \\ 4x + 2y \leq 6 \end{cases}$



5. $\begin{cases} x + 2y < 6 \\ y \geq x^2 - 2 \end{cases}$



6. $\begin{cases} x^2 + y^2 < 25 \\ y \geq |x| - 3 \end{cases}$



7.2 Multivariable Linear Systems Homework

Name _____

Date _____ Period _____

Problems 1-2, use back-substitution to solve the system of linear equations.

1. $\begin{cases} 2x + y - 3z = 16 \\ y - 2z = 8 \\ z = -2 \end{cases}$

2. $\begin{cases} 4x - 3y - 2z = -14 \\ 6y - 5z = -21 \\ z = 1 \end{cases}$

Problems 3 - 5, perform the row operation and write the equivalent system.

3. Add Equation 1 to Equation 2. Explain what this accomplished.

$\begin{cases} x - 2y + 3z = 1 \\ -x + 3y - 5z = 0 \\ 2x - 3z = 7 \end{cases}$

4. Add Equation 1 to Equation 3. Explain what this accomplished.

$\begin{cases} x - 2y + 3z = 1 \\ -x + 3y - 5z = 0 \\ 2x - 3z = 7 \end{cases}$

5. Use your work from questions 3 and 4 to perform row operations that will solve the system of equations. Explain your steps and state your solution.

7.3 Matrices and Systems of Equations Homework

Name _____

Date _____ Period _____

Problems 1 – 3, write the augmented matrix to represent each system.

1. $\begin{cases} 3x + y = 11 \\ 2x - y = 14 \end{cases}$

2. $\begin{cases} x - 4y + z = 9 \\ 3y + 4z = 10 \\ 2x + 3z = 6 \end{cases}$

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

Problems 4 – 7, perform each row operation on the given augmented matrix.

4. $\left[\begin{array}{ccc|c} 1 & -3 & 4 & 1 \\ 2 & -5 & 6 & 2 \\ -3 & 3 & 4 & -7 \end{array}\right]$

A.) $R_2 = -2r_1 + r_2$

B.) $R_3 = 3r_1 + r_3$

5. $\left[\begin{array}{ccc|c} 1 & 2 & 1 & 5 \\ 1 & -2 & -1 & 3 \\ 2 & -3 & -3 & 4 \end{array}\right]$

A.) $R_1 = r_1 + r_2$

B.) $R_1 = \frac{1}{2}r_1$

6. $\left[\begin{array}{ccc|c} 2 & -1 & -1 & 3 \\ 1 & 2 & 2 & 0 \\ 1 & 1 & 1 & 6 \end{array}\right]$

A.) $R_2 = -2r_3 + r_1$

B.) $R_3 = r_2 - r_3$

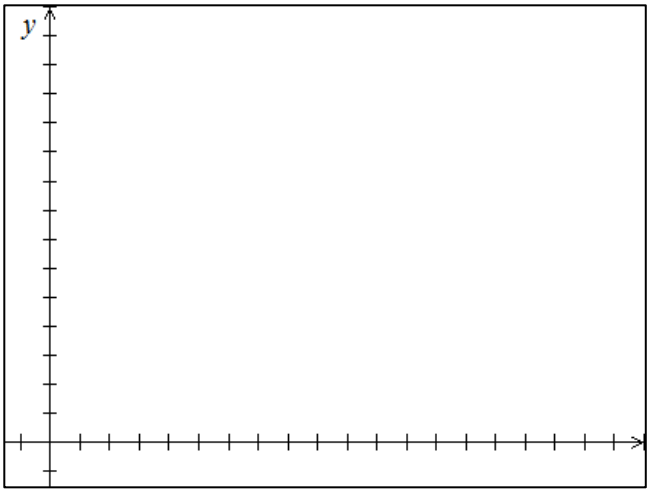
7. $\left[\begin{array}{ccc|c} 1 & -1 & 1 & 5 \\ 2 & 3 & -1 & 1 \\ 2 & -2 & 5 & 4 \end{array}\right]$

A.) $R_3 = r_3 - 2r_1$

B.) $R_2 = 2r_1 - r_2$

Problems 11 – 14, solve.

11. Your school store carries two types of t-shirts. The first style has your school logo on the front and costs $3.50 per shirt. The second costs $4.50 per shirt and has the logo on the front and your mascot on the back. You are in charge of ordering from the wholesaler and have a maximum budget of $900. You have storage room for more than 144 shirts. You need to have at least 4 dozen of the single logo shirts and 3 dozen of the double logo style. Write and graph a system of inequalities that describe all the possibilities for stocking the school store with shirts.



12. Your drama club is promoting the spring play with plans to sell 600 tickets. Adult tickets will sell for $8 and student tickets will cost $5. The club needs to have gross receipts of $3,000. They need to sell at least 225 student tickets and 125 adult tickets. Write a system of inequalities that describes all the possibilities for the number of tickets that can be sold to meet the conditions. Sketch the system.

