Practice Problems for Math Success

Linear System of Equations

This problem set focuses on solving systems of linear equations. Show all your work and provide clear explanations where necessary. You may use a calculator for basic arithmetic, but you should know the unit circle and be able to find exact values of trigonometric functions. Try to complete the problems without relying on external resources first, then check your answers or seek help if needed.

1. Solve the following system of equations using the **substitution method**:

$$x + y = 5$$
$$2x - y = 1$$

2. Solve the following system of equations using the **elimination method**:

$$3x - 2y = 10$$
$$x + 2y = 2$$

3. Solve the following system of equations using any method you prefer:

$$4x - 3y = 11$$
$$8x - 6y = 22$$

What does the solution tell you about the relationship between the two equations?

4. Find the values of k for which the following system of equations has **no solution**:

$$x + 2y = 3$$
$$kx + 4y = 1$$

Explain your reasoning.

5. A movie theater sells adult tickets for \$12 and child tickets for \$8. During a certain showing, the theater sold a total of 200 tickets and collected \$2040 in revenue. Set up a system of equations to represent this situation and solve it to find the number of adult tickets and child tickets sold.

6. A chemist needs to create a 50-liter solution of a 30% acid concentration. She has two stock solutions available: one with a 20% acid concentration and another with a 40% acid concentration. How many liters of each stock solution should she mix to obtain the desired solution?