

ALGEBRA PROBLEM SESSION # 4 - PRACTICE

Systems of Linear Equations

1. When is it easier to use the addition method to solve a system? When is it easier to use the substitution method?
2. When using the addition method to solve a system, how can you tell if the system (a) has no solution? (b) has infinitely many solutions? What is the relationship between the two graphs in each?
3. When using the substitution method to solve a system, how can you tell if the system (a) has no solution? (b) has infinitely many solutions? What is the relationship between the two graphs in each?
- 4-5. Tell which method you would use to solve the following system. Why? DO NOT SOLVE.
$$\begin{array}{rcl} y = 3x + 1 & & 2x + 4y = 9 \\ 3x + 2y = 12 & & 3x - 5y = 20 \end{array}$$
6. Explain how they can use inspection to classify a linear system as consistent and independent, inconsistent, or consistent and dependent.
7. Can a system of two equations in two variables have exactly two solutions? Why or why not?
8. Form an (a) independent system of equations (b) dependent system of equations with a solution of (-5, 2).
9. Solve the following systems:
$$\begin{array}{lllllll} 4x + 6y = 26 & x - y = 3 & x = 9 & 4x - 2y = 10 & 7x + 3y = 4 & x = 2y - 1 & y = 3x + 5 \\ 6x - 2y = 28 & x + y = 5 & 2x + y = 8 & 2x - 5 = y & y = 3x + 4 & x = y - 1 & 3x - 7 = y \end{array}$$

Solving Verbal Problems Using Systems of Equations

- (a) Complementary angles are two angles whose sum is 90 degrees. Of two complementary angles, one is five degrees less than one-fourth the size of the other. Find the measures of the two angles.
- (b) How many ounces of hamburger that is 75% lean must be mixed with hamburger that is 90% lean to get 65 ounces of hamburger that is 85% lean?
- (c) A small plane travels 3000 kilometers in 5 hours with the help of a tailwind. Returning takes 6 hours against the wind. Find the speed of the wind; then find the speed of the plane in still air.
- (d) A sight-seeing boat completes a round trip to an island off shore in 5 hours. Its average rate going is 20mph and its average rate returning is 30mph. How far is the island from shore and what was the traveling time to the island?
- (e) My desk drawer has 20-cent coupons and 25-cent coupons. The total number of coupons in my drawer is 30. How many do I have of each if the total value of the coupons is \$6.40?
- (f) The sum of two numbers is 840. The larger number minus 8 times the smaller is 84. Find the numbers.
- (g) How many liters of a 25% solution of a drug must be mixed with a 55% solution of the drug to produce 50 liters of a 46% solution of this drug?
- (h) I invested in two accounts – savings, paying 3.5% interest and a market account paying 6.5%. I invested amount A in savings and B in the market account. In one year, I earned \$51.88 interest. The next year I invested A in the market account and B in savings earning \$6.24 more interest than I did last year. What are the amounts A and B?
- (i) The coins in the bank have a value of \$5.94 and consist of pennies and nickels. There are 358 coins. How many of each coin are in the bank?
- (j) A pocketful of coins includes dimes and quarters. The total value of the 36 coins is \$5.10. Find the number of each coin.

Selected problems were taken from Blitzer Algebra For College Students