

There are 10 problems on this exam. Carefully read and follow all directions. In order to receive credit show all necessary work. No credit will be given for an answer I cannot find or cannot read. All answers should be exact unless specified otherwise.

1. (a) If \$625 is invested in an account earning 1.7% annual interest compounded 6 times a year, what will be the value of the account after 4 years? (5 points)

- (b) If \$609 is invested in an account earning 1.4% annual interest compounded continuously, what will be the value of the account after 4 years? (5 points)

2. (a) A quantity is decaying exponentially according to the formula $A(t) = A_0e^{-kt}$ where the time t is measured in months and the quantity is measured in grams. If the half-life for the quantity is 21 months, what is the value of k ? (5 points)

- (b) If the initial amount of the quantity in part (a) is 131 grams, how much of the quantity will remain after 3 years? Give your answer correct to the nearest hundredth. (5 points)

3. Use only the substitution method to find the point of intersection of the following pair of lines. DO NOT USE ELIMINATION. (10 points)

$$4x + y = 21$$

$$-5x - 5y = -90$$

4. Use only the elimination method to find the point of intersection of the following pair of lines. Eliminate x to find y and then eliminate y to find x . DO NOT USE SUBSTITUTION. (10 points)

$$-5x + 5y = -4$$

$$x - 4y = 0$$

5. Use the method of elimination and/or substitution to find the solution of the following system of equations. (12 points)

$$2x + y - 9z = -30$$

$$5x + 5y + 4z = -27$$

$$-9x + y - 6z = 31$$

6. The following system of equations has infinitely many solutions. Use the method of elimination and/or substitution to determine a description of all points satisfying this system. (12 points)

$$3x - y - 8z = 26$$

$$-x + 3y + 16z = -14$$

$$-2x + 3y + 17z = -22$$

7. List three specific solutions of the system in problem 6. (6 points)

8. Becky likes her M & M candies to be 55% blue. At the bulk candy store she can buy a mixture that is 30% blue or one that is 65% blue. Set up and solve a system of equations to determine how many ounces of each mixture she should buy if when she combines them she wants 35 ounces that are 55% blue. (10 points)

9. With a tail wind, an airplane can fly 1000 miles in 4 hours. Against this same wind the airplane can fly the same distance in 5 hours. Set up and solve a system of equations to determine the wind speed and the speed of the airplane. (10 points)

10. Indicate whether each of the following systems of linear equations is inconsistent, independent, or dependent. (3 points each)

(a) $-4x - 2y = -6$
 $4x + 2y = 6$

(b) $-8x + 4y = -14$
 $16x - 8y = 29$

(c) $-4x - 4y = -20$
 $4x + 6y = -40$