There will be 5-8 problem on the actual exam. All of them will be similar to the problems shown here. Remember to make a formula sheet for the exam (only formulas and definitions!).

1) You are charged with buying DVDs for a movie rental store. The owner would like to buy three categories of movies: new releases, horror, and westerns. You are given a budget of $5600 and instructed to buy 1000 DVDs. The owner says that she would like you to buy three times as many horror movies as westerns. You find a supplier that will sell new releases in bulk for $7 per DVD, horror movies for $4 per DVD, and westerns for $2 per DVD. How many of each category of movie should you buy?

   a) Define the variables.

      $x =$

      $y =$

      $z =$

   b) Set up the system of equations required to solve the problem. **Do not solve the system.**

   c) Write the matrix that corresponds to the system of equations from part b). **Do not reduce the matrix.**

2) Tom borrowed $2,000 from his father and agreed to pay a simple interest rate of 5.5%. After some time had passed, he paid his father $2,302.50. How long did it take Tom to pay back the loan, including interest?

3) Harold will receive a $3000 income tax refund. For a $40 fee, her accountant gives her an "interest free" loan for the refund amount. The loan will be due in four weeks. If Harold views the fee as simple interest, what is the simple interest rate of the loan?

4) Your pension plan is an annuity with a guaranteed return of 4.5% per year, compounded monthly. You would like to retire with a pension of $4,000 per month for 25 years. If you work for 30 years before retiring, how much must you and your employer deposit each month into the fund?

5) Determine the amount of money, to the nearest dollar, that you must invest at 9% interest per year, compounded annually, so that you become a millionaire in 28 years.

6) Find the present value of an investment that earns 7% per year and is worth $1,000 after 6 months.

7) Find the periodic payments PMT necessary to accumulate $40,000 in a sinking fund that pays 7% per year, with monthly payments for 5 years (assume monthly compounding).

8) Find the present value PV of the annuity necessary to fund withdrawals of $100 per month for 20 years, if the annuity earns 2% per year (assume monthly compounding).

9) Find all solutions of the given system of equations.

$$0.3x + 0.1y = 0.7$$
$$0.4x - 0.4y = 1.6$$

10) Solve the system of equations using Gauss-Jordan row reduction. You can put the matrix in row-echelon form (with zeros in the lower left triangle) and then use back-substitution if you wish.

$$x + y + 6z = 4$$
$$x - y + 2z = 2$$
$$x \quad\quad + 2z = 0$$