

Math 135: Intermediate Algebra

Worksheet 1

September 27, 2007

1. You have two solutions; solution I contains 10% chemical X, and solution II contains 50% chemical X.
 - (a) You mix 5 liters of solution I with 3 liters of solution II. What percent chemical X is the resulting solution?
 - (b) You want to make 12 liters of a solution that contains 20% chemical X. How many liters of solutions I and II should you mix together?
 - (c) To make a solution that is 40% chemical X, what *ratio* of solution I to solution II should you mix? By ratio, we mean something like x parts solution I to y parts solution II.
2. A student in the math class has turned in 6 homework assignments and gotten scores of 85, 91, 89, 96, 88, and 90. He wants to have an average of 90 or higher.
 - (a) Suppose there are a total of 7 homework assignments for the class. What is the lowest score he can get on the final assignment?
 - (b) Suppose there are a total of 8 homework assignments. What is the lowest *average* score he can get on the remaining 2 assignments?
 - (c) Suppose there are 6 homeworks and a final exam. The final exam is worth 3 homework assignments. What is the lowest score he can get on the final?
 - (d) Now suppose final exam is worth 2.5 homework assignments. What is the lowest score he can get on the final?
3. A child breaks open her piggy bank and counts the number of quarters and dimes she finds.
 - (a) She has 25 quarters and dimes put together. Write an algebraic expression for the number of quarters she has and for the number of dimes she has. Be sure to state clearly what your variable represents.
 - (b) Write algebraic expressions for the total value of the quarters and of the dimes.
 - (c) Write an algebraic expression for the total amount of money she has. What is the largest value it could have? What is the smallest value? Explain both in words and in mathematical terms.
 - (d) Suppose she has \$4.30 total. How many quarters does she have? How many dimes?
4. A woman has \$20,000 to invest. She wants to put some of it into a savings account and some of it into the stock market. The savings account earns 3% interest each year, and the stocks earn 8% interest each year.
 - (a) Suppose she puts half the money into stocks and half into the savings account. How much money will she have at the end of one year? How much interest will she have earned?
 - (b) If she puts half the money into each option, and lets them accumulate interest for 5 years, how much will money will she have in savings and how much in stocks?
 - (c) If she puts x dollars in the savings account, write an algebraic expression for the amount she puts into stocks.
 - (d) Write algebraic expressions for the total amount of money she will have in the savings account and in the stocks after one year.
 - (e) After one year, she has a total of \$21,000 dollars. How much did she put in the savings account and how much did she put in stocks?
 - (f) Write algebraic expressions for the total amount of interest she will have earned from the savings account and from the stocks.
 - (g) Suppose she earns \$800 in one year. How much did she invest in each option?

5. A train leaves San Francisco travelling at 80 miles per hour. Two hours later, a plane leaves San Francisco headed for the same destination as the train. It travels at 500 miles per hour.
- (a) Let t represent the amount of time that has passed since the train left. Write an algebraic expression for the distance travelled by the train.
 - (b) Write an algebraic expression in terms of t for the distance travelled by the plane.
 - (c) How long will it take before the plane passes the train?
 - (d) How far have the two of them travelled at the point when the plane passes the train?
 - (e) Now suppose that, instead of leaving two hours later, the plane left three hours later. What is the smallest distance away the destination would have to be for it to be faster to take the plane than to take the train?
6. A farmer is fencing off a rectangular plot of land that is twice as long as it is wide. He has 600 meters of fence available.
- (a) What is the largest area he can enclose?
 - (b) Suppose one of the long sides of the plot is against a river and thus does not need to be fenced. In that case what is the largest area the farmer can enclose?
 - (c) If the farmer used twice as much fencing, how many times more area could he enclose?