Math 135: Intermediate Algebra
Worksheet 2
Oct 4, 2007

1. A physics experiment should be conducted at a temperature of -40 degrees Celsius. Unfortunately, the physicist doing the experiment only has a Farenheit thermometer. For this problem, let F be the Farenheit temperature and C be the Celsius temperature.

   (a) The physicist remembers that the rule for converting Farenheit to Celsius is to take the Farenheit temperature, subtract 32, then multiply the result by $\frac{5}{9}$. Write an equation expressing this relationship between Farenheit and Celsius temperatures.

   (b) The experiment has a tolerance of 5 degrees Celsius. Write a compound inequality expressing this statement using the variable C.

   (c) Write the inequality from part (b) using F instead of C as your variable.

   (d) For what temperature range in Farenheit will the experiment work? Use your inequality from part (c).

2. A man is shopping for a cell phone, and he is trying to decide which plan to buy.

   (a) One plan (plan A) has a rate of \$0.10 per minute for calls, but you also have to pay a flat fee of \$20 per month. Express the total cost of this plan in terms of m, the number of minutes the man will talk in a month.

   (b) A second plan (B) only has a \$10 per month flat fee, but costs \$0.20 per minute, Express the total cost of the second plan in terms of m.

   (c) If plan A is cheaper for the man, what is the minimum number of minutes per month he plans to use? (Hint: write an inequality comparing the cost of plan A to the cost of plan B.)

   (d) Later, the man is offered a third plan (C). This plan has a \$15 per month flat fee, and costs \$0.15 per minute for calls, but the first 20 minutes of calls each month are free. Express the total cost of this plan in terms of m.

   (e) For what range of minutes is the plan C the cheapest of the three?

3. A chemist is preparing a medium strength solution of sodium hydroxide (NaOH) by mixing two other NaOH solutions, one of which is strong (30% by mass) and one of which is weak (5%). He wants to have 5 liters of the medium solution, which will be 10% NaOH.

   (a) Let s be the number of liters of the strong solution. Fill in the chart below:

Solution	Amount	NaOH Percentage	Total NaOH
Weak			
Strong			
Medium			

   (b) How much of each solution should the chemist use?

   (c) The medium solution must be 10% NaOH to an accuracy of 2%. Write an inequality in terms of s expressing this statement.

   (d) Find the minimum and maximum amount of strong solution the chemist can use and still produce 5 liters of an acceptable medium solution.

   (e) Suppose the chemist uses too much strong solution, and produces 5 liters of solution that is 15% NaOH. What is the minimum amount of weak solution he can add to produce a result that is within the 2% tolerance?