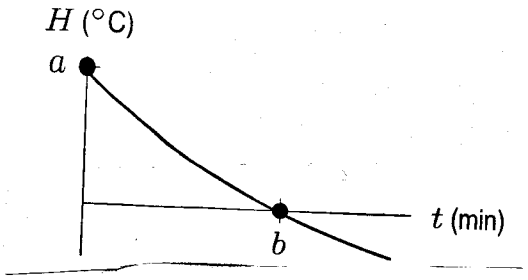
Honors 125
Homework #1

Name _____
Due Wednesday, September 16, 2009

1. An object is put outside on a cold day at time $t = 0$. Its temperature, $H = f(t)$, in °C, is graphed below.



   a) What does the statement $f(30) = 10$ mean in terms of temperature of the object? Include units for 30 and 10 in your answer.

   b) Explain what the vertical intercept, a represents in terms of temperature of the object and time outside.

   c) Explain what the horizontal intercept, b, represents in terms of temperature of the object and time outside.

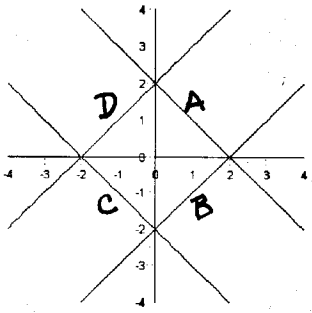
2. The figure below shows four lines given by the equation $y = mx + b$. Match the lines to the conditions on the parameters m and b.

   a) $m > 0, b > 0$ _____

   b) $m > 0, b < 0$ _____

   c) $m < 0, b < 0$ _____

   d) $m < 0, b > 0$ _____



3. A city's population was 35,700 in the year 2000 and since then has grown by 950 people per year.
   a) Write a linear function that describes the city's population P as a function of the number of years, t, since 2000.

Problem 3 is continued on the next page.

b) Give units for and interpret the slope and vertical intercept of the function you found in part a.

c) If the population continues to grow at the same rate, what is the population predicted to be in 2015?

d) If the population continues to grow at the same rate, in what year is the population expected to reach 48,000?

4. A company can produce 1000 puzzles per month at a total cost of $6000 and it can produce 1500 puzzles per month at a total cost of $7500. It can sell the puzzles for $5 each.
   a) Express the monthly cost of manufacturing puzzles, C, as a linear function of x, the number of puzzles produced.

   b) What are the company's monthly fixed costs and what is the marginal cost per puzzle?

   c) Write the revenue and profit functions for this company's monthly production of puzzles.

   d) How many puzzles must the company sell per month to break even?

5. Find a linear equation whose graph is the line with the properties that it is through the point (5, -1) and decreasing at a rate of 2 units of y per 1 unit of x.

6. Problem 12 on page 64.

7. Problem 34 on page 80.