

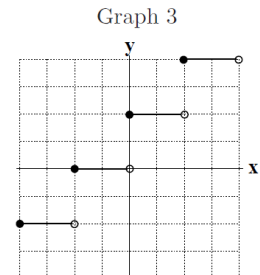
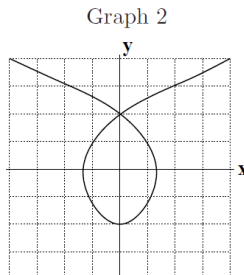
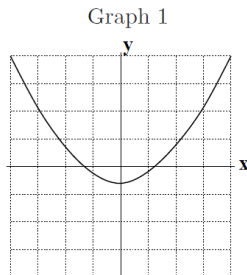
## Section 1.1: Functions and Function Notation

1. Consider the table below.

$t$  = time (in years) after the year 2000  
 $w$  = number of San Francisco '49er victories

$t$	0	1	2	3	4	5	6	7	8	9
$w$	6	12	10	7	2	4	7	5	7	8

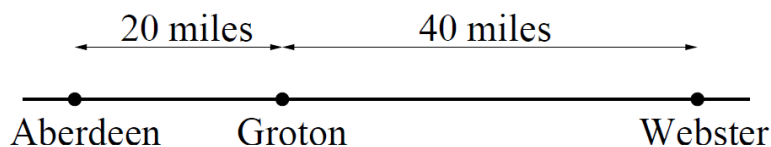
- (a) Does this table represent  $w$  as a function of  $t$ ? How do you know?
  - (b) In what other ways could you represent this relationship? Explain.
  - (c) What is  $f(4)$ ?
  - (d) Explain the meaning of  $f(4)$  in a sentence or two. Include units.
2. Which of the graphs below represent  $y$  as a function of  $x$ ? Explain how you know in a sentence.



3. Refer to Graph 1 above. Fill in the missing values:

- (a) What is the  $y$ -value when  $x = 0$ ?
- (b)  $f(0) = ?$
- (c) What are the  $x$ -values that produce a  $y$ -value of 0?
- (d)  $f(?) = 0$

4. A woman drives from Aberdeen to Webster, South Dakota, going through Groton on the way, traveling at a constant speed for the whole trip. (See diagram below.)



- (a) Complete parts i through vi below in order to sketch a graph of the woman's distance from Webster as a function of time.
- What variable should be graphed on the  $x$ -axis? How do you know?
  - What variable should be graphed on the  $y$ -axis? How do you know? (Make sure to be specific!)
  - When time is equal to zero, how far away is the woman from Webster? Graph this point.
  - You are not given her exact speed, but you are given other information about her speed. What information about her speed do you know?
  - What is the woman's distance from Webster after she has arrived in Webster?
  - Without knowing any more information, sketch an approximation of what a graph could look like given the information that you know. Make sure you have labeled your axes.
- (b) Complete parts i through vi below in order to now sketch a graph of the woman's distance from Groton as a function of time.
- What variable should now be graphed on the  $y$ -axis? How do you know?
  - When time is equal to zero, how far away is the woman from Groton? Graph this point.
  - What is the woman's distance from Groton after she has arrived in Groton?
  - The woman continues driving, after she has left Groton. What happens to her distance after she leaves?
  - When the woman arrives in Webster, what is her distance away from Groton?
  - Without knowing any more information, sketch an approximation of what a graph could look like given the information that you know. Make sure you have labeled your axes.

5. The combined sales tax rate for Chicago, IL is 10.25%.
- (a) If the price of a Sister Jean t-shirt is \$20.00, what is the total cost you would pay at the register, including tax?
  - (b) If the price of an item in Chicago is  $P$  dollars, express the total cost (including tax),  $C$ , as a function of  $P$ . Can you simplify your answer?
  - (c) You notice that you can purchase a Sister Jean t-shirt tax-free at the airport. The shirt, however, costs \$24.00. It is on sale for 15% off. What is the total cost of the t-shirt, after the discount?
  - (d) If the price of an item is still  $P$  dollars, express the cost,  $C$ , of the item with a 15% discount as a function of  $P$ . Can you simplify your answer?
6. There are  $x$  male job-applicants at a certain company and  $y$  female applicants. Suppose that 15% of the men are accepted and 18% of the women are accepted. Write an expression in terms of  $x$  and  $y$  representing each of the following quantities:
- (a) The total number of applicants to the company.
  - (b) The total number of applicants accepted.
  - (c) The percentage of all applicants accepted.