College Algebra
Workshop 1

Unit 1 - Functions and Their Representations
Additional Practice Problems

1. Which of the following relations is *not* a function? Explain.

a.

Input	0	1	2	3	4
Output	0	-1	-2	-3	-4

b.

Input	0	1	2	3	4
Output	4	4	4	4	4

In Practice Exercise 2, a function is represented by a symbol rule. Use the symbol rule to evaluate each of the given function outputs. Do as much of the work by hand as you can. (*Note*: The output may not be defined.)

2. $y(s) = (s-1)^{1/3}$

a. $y(0)$

b. $y(\frac{28}{27})$

e. $y(y(9))$

f. $y(h^3+1)$

3. For the function f represented by the symbol rule $f(x) = \frac{2}{3}x + 5$, find the input or inputs that match each of the following outputs. Be sure to find *all* matching inputs. If there are no matching inputs, write "none." (*Hint*: In each part you must solve an equation.)

a. 3

b. 11

c. 0

d. -2.03

4. For the function f represented by the symbol rule $f(x) = 3x^2 - 2x$, find the input or inputs that match each of the following outputs. Be sure to find *all* matching inputs. If there are no matching inputs, write "none." (*Hint*: In each part you must solve an equation.)

a. 8

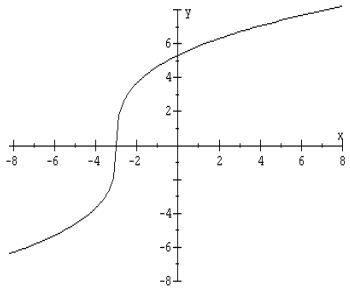
b. 21

c. 0

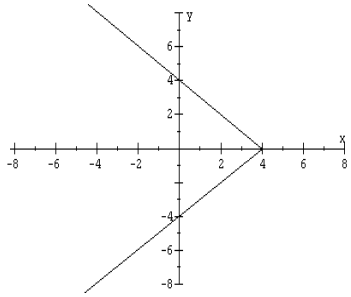
d. x

5. Which of the following relations are functions assuming x is the input variable? Which are functions if we assume that y is the input variable?

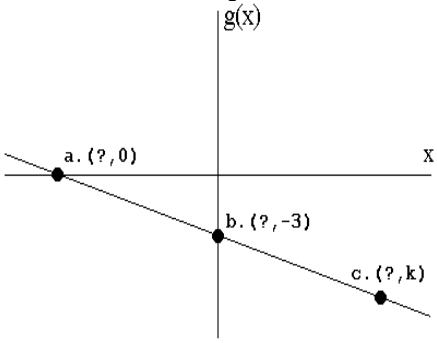
a.



b.



6. The graph of the function *g* with symbol rule $g(x) = \frac{-6-x}{2}$ is shown here. Each of the three points plotted in the figure is contained on the graph of the function *g*, but only the output coordinates are shown. Find the input coordinate of each point.



7. Let F be the average number of close friends for a typical adult female x years of age.
a. Interpret the expression: $F(25) = 5.2$.

b. Express using function notation: Adult females who are 40 years old usually have about 3 close friends.

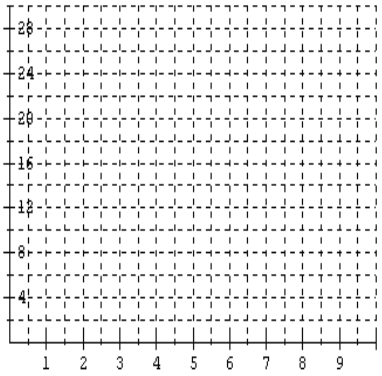
c. Does the expression $F(150) = 0.5$ make practical sense? Explain.

8. The healthy economy of the 1990s contributed to a major increase in the amount of money donated to colleges and universities during this decade. Table 1 records the amount of money, in billions of dollars, donated to colleges and universities each year from 1994 to 1998. For instance, in 1994, donations to colleges and universities totaled \$12.3 billion.

Year (t)	1994	1995	1996	1997	1998
Donations (*in billions of* \$)	12.3	12.5	14	16	18.4

Table 1 College Donations Related to Time

a. Plot a point on a set of axes for each pair of data values in Table 1. Then draw a line through this set of points that "fits" the set of points. (*Hint*: You can simplify the problem by "aligning" the input numbers in the table as follows: Let 1994 correspond to time $t = 0$, let 1995 correspond to time $t = 1$, and so forth.)



b. Use the line drawn in part a to predict total donations to colleges and universities in 2001. **Express** this information in function notation. Use D as the name of the function.

c. How confident are you of the prediction made in part b? Why might this prediction be incorrect? Do you feel this prediction may too high or too low?

d. Use the graph of the function D to **evaluate** $D(6)$, and then **interpret** this value using a complete sentence.

f. Use the graph of the function D to predict when donations to colleges and universities will reach \$26 billion per year.