

Name:
Algebra 2

Date:

Day 3—Cumulative Review: Word Problems and Analyzing Graphs

I.

1. Mrs. Ward's seven children individually went trick-or-treating in the neighborhood. Mrs. Ward wants to look at the relationship between the number of houses approached (input) and the total number of pieces of candy received (output). Here are the numbers:

	Houses	Candy
Ann	25	32
Bob	31	38
Cindy	29	38
Danielle	37	48
Ed	31	36
Francis	33	41
Gerry	30	32

a. What are the domain and range of this relation?

b. Is this a function (is the number of pieces of candy received a function of the houses approached)? Explain why or why not.

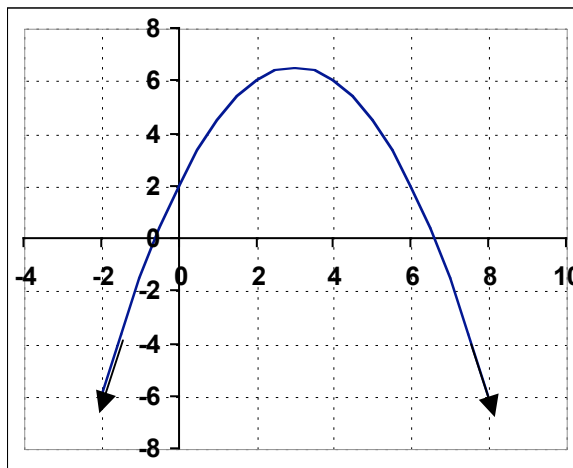
2. Use the graph of the function $f(x)$ below to answer the following questions.

a. What is $f(6)$?

b. What are the solutions to $f(x)=6$?

c. Estimate the zeros of $f(x)$?

d. What is $f(0)$?

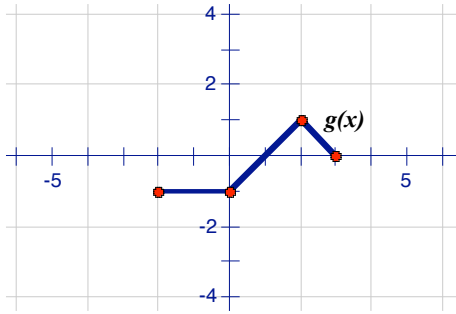


e. What are the domain and range of $f(x)$?

f. What values of x solve the inequality $f(x)>2$?

Answer the following questions about the graph of $g(x)$ shown below.

3.



- Find $g(2)$.
- Find $g(x) = 0$
- Find $g(x) \geq 0$
- What is the domain of $g(x)$?
- What is the range of $g(x)$?
- Write a piece-wise function that represents $g(x)$.

II. Solve the following word problems algebraically:

4. Holly is planning a holiday party. She rents tables at a rate of \$40 per hour and chairs at a rate of \$25 per hour. If there were a total of 14 tables and chairs rented, and the total cost was \$380 then how many of each did she rent?

- Define your variables:
- Write the system of equations to represent the situation above.
- Solve the system of equations.

5. When a rectangle's length was quadrupled and its width was doubled, its perimeter went from 42 to 150. What were its original dimensions?

6. (omitted)

7. An ice cream truck sells ice creams and slushies. The truck has room for at most 150 items in his cooling device (fridge/freezer). He earns profit of \$2 for each ice cream sold \$1 for each slushie sold and. His goal is to make at least \$210 .

- Define your variables.
- Write the system of inequalities to represent the situation above.
- Graph the system of inequalities.

8. A teacher starts with a carton of 5000 sheets of paper and uses 160 sheets a day.

- a. Define a function whose input is the number of days and whose output is the number of sheets remaining.
- b. Write an equation whose solution is the number of days until the carton is empty.
- c. Solve the equation algebraically. Show your work!

9. A runner starts running at a constant speed on a trail that has mile markers and starts her stopwatch. After $2\frac{1}{3}$ minutes, she sees the 2 mile mark. When her stopwatch says $23\frac{1}{3}$, she sees the 5 mile mark.

- a. How fast was she running, in miles/minute? (Note that most runners use minutes/mile, but not us.)
- b. Write an equation that relates the time in minutes (x) to her position on the trail in miles (y). So, for example, if $x=2\frac{1}{3}$ then $y=2$.
- c. Write an equation whose solution tells what her time was at the four mile mark.
- d. Solve that equation to find what her time was at the four mile mark.

10. Answer these questions about the function $g(x) = -1.5x + 4$

- a. What is/are the zero(s) of $g(x)$?
- b. What is $g(3)$?
- c. Solve: $g(x)=18$.
- d. Solve: $g(x) < 7$.
- e. What is the domain? What is the range?
- f. On graph of $g(x)$, a point has an x -coordinate of 8. What is its corresponding y -coordinate?

11. The tables of values below show some of the inputs and outputs for the functions $f(x)$ and $g(x)$. Which one of these has a graph that is a line? Explain how you know.

x	$g(x)$	x	$f(x)$
-3	15	-3	8
-1	12	4	7
3	6	11	6
5	3	15	5
11	-6	16	4

12. For whichever one function in problem 6 above was a line, answer the following questions:

- What is the equation that defines that function?
- What are the exact coordinates of the x - and y -intercepts of the graph of that function?
- What is the input that makes the output equal to 25?
- What is the y -coordinate of the point on the graph that has an x -coordinate of 20

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**ANSWERS**

1a. Domain: 25, 31, 29, 37, 33, 30; Range: 32, 38, 48, 36, 41.

1b. Not a function because 31 in the domain is associated with two elements of the range: 36 and 38.

2a.  $f(6)=2$ ; b.  $x=2,4$ ; c.  $-\frac{3}{4}, 6\frac{3}{4}$ ; d. 2; e. domain: all real numbers; range (approx):  $y < 6\frac{1}{2}$ ; f.  $0 < x < 6$ .

3a. 1; b.  $x=1, x=3$ ; c.  $1 \leq x \leq 3$ ; d. domain:  $-2 \leq x \leq 3$ ; e. range:  $-1 \leq x \leq 1$ . f.

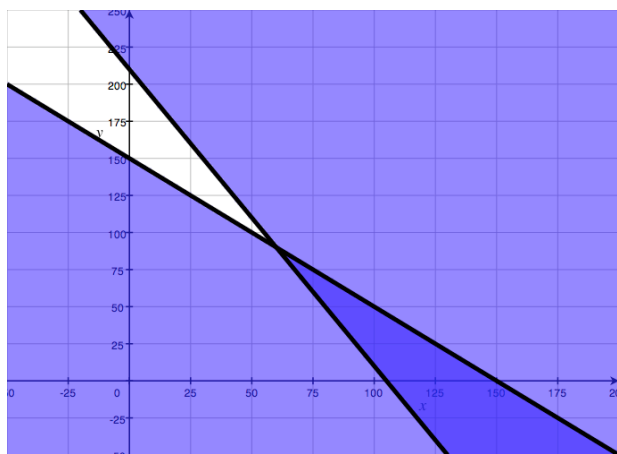
$$g(x) = \begin{cases} -1, & -2 \leq x < 0 \\ x-1, & 0 \leq x < 2 \\ 3-x, & 2 \leq x \leq 3 \end{cases}$$

4. 2 tables, 12 chairs

5.  $33\frac{1}{2} \times 9\frac{1}{2}$

6.(omitted)

7. a.  $x$  = number of ice creams,  $y$  = number of slushies; b.  $x + y \leq 150$   
 $2x + y \geq 210$



8a.  $f(x)=5000-160x$ ; b.  $0=5000-160x$ ; c.  $x=31\frac{1}{4}$

9a.  $\frac{1}{7}$  mi/min; b.  $y - 2 = \frac{1}{7}(x - 2\frac{1}{3})$ ; c.  $4 - 2 = \frac{1}{7}(x - 2\frac{1}{3})$ ; d.  $\frac{49}{3}$ .

11. a.  $x = \frac{8}{3}$  b.  $g(3) = -0.5$  c.  $x = -\frac{28}{3}$  d.  $x > -2$  e. Domain: all reals; Range: all reals. f.  $g(8) = -8$

12.  $g(x)$  is the line  $y = -\frac{3}{2}x + \frac{21}{2}$ .  $f(x)$  is not a line because its slope gets steeper as  $x$  gets larger.