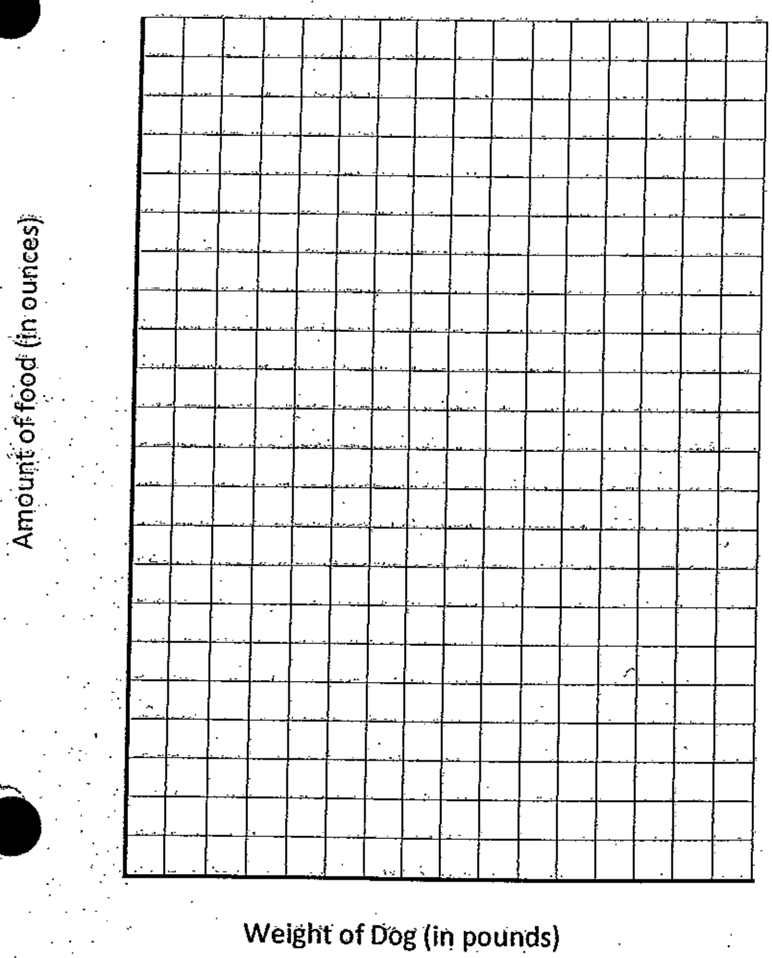
Food Feeding Chart	
Weight of Dog (in pounds)	Daily Amount of Food (in ounces)
3	3
12	12
20	20
50	35
100	60
Over 100	60 ounces plus 6 ounces for each additional 10 pounds of weight

Adult dogs that weigh up to 20 pounds are classified as *small* dogs. Dogs that weigh 20 to 100 pounds are classified as *mid-size* dogs. Finally, dogs that weigh more than 100 pounds are classified as *large* dogs.

Write a linear equation that expresses the ounces of dog food in terms of the dog's weight for each size dog.

What is the domain for each equation?

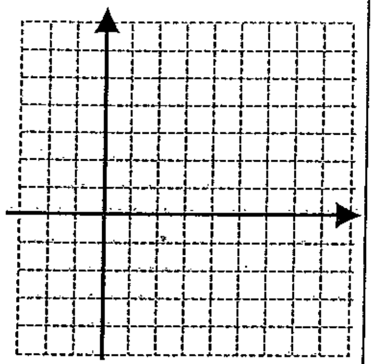
Graph your function:



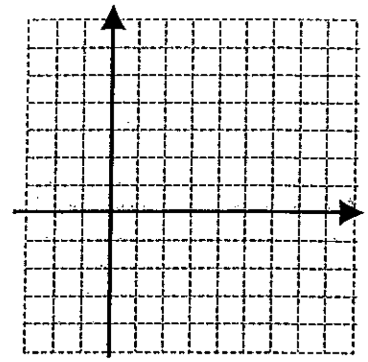
Write your equations as a piecewise function.

Practice: Graphing Piecewise Functions

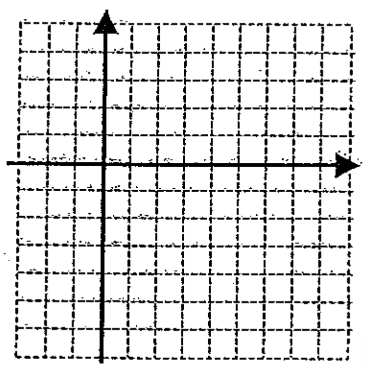
$$f(x) = \begin{cases} \frac{1}{2}x & x < 4 \\ x - 3 & x \geq 4 \end{cases}$$



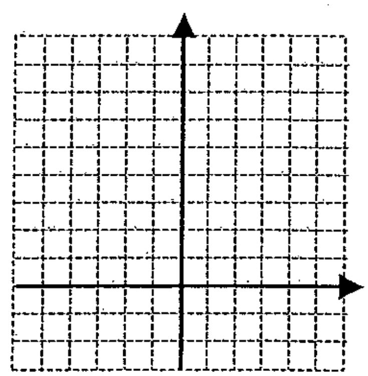
$$f(x) = \begin{cases} \frac{1}{2}x & x < 4 \\ x - 2 & x \geq 4 \end{cases}$$



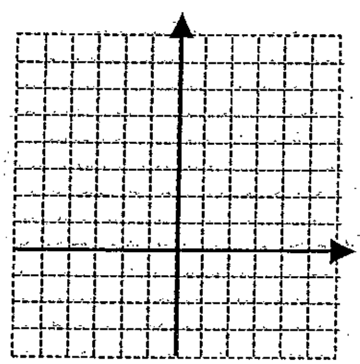
$$f(x) = \begin{cases} \frac{1}{3}x & x < 3 \\ 1 - x & x > 3 \end{cases}$$



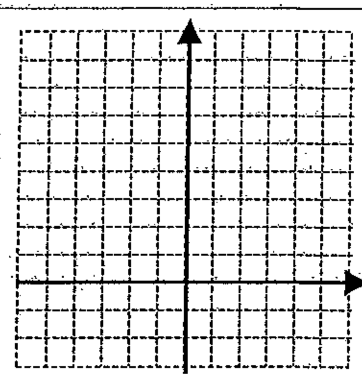
$$f(x) = \begin{cases} -x & x < -1 \\ -2 & -1 \leq x < 2 \\ 2x & x \geq 2 \end{cases}$$



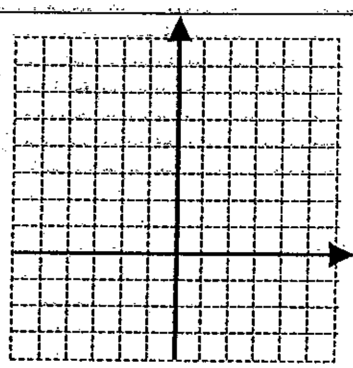
$$f(x) = \begin{cases} 3 - x & x \leq -2 \\ 2x & -2 < x \leq 3 \\ 5 & x > 3 \end{cases}$$



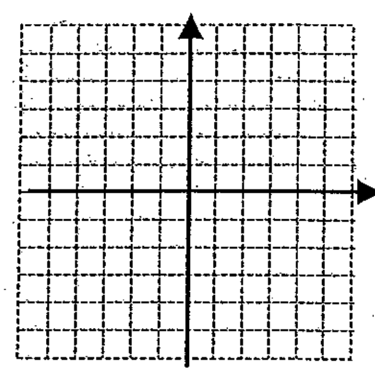
$$f(x) = \begin{cases} x^2 & x \leq -1 \\ 4 & -1 < x < 1 \\ x^2 & x \geq 1 \end{cases}$$



$$f(x) = \begin{cases} -x^2 & x < -1 \\ -x & -1 \leq x \leq 1 \\ x^2 & x > 1 \end{cases}$$



$$f(x) = \begin{cases} 5 & x < -2 \\ -x^2 & -2 \leq x < 2 \\ x - 2 & x \geq 2 \end{cases}$$



Name ______________________ Date __________ Class __________

TEKS 2A.1.A

LESSON 9-2

Practice B

Piecewise Functions

Evaluate each piecewise function for $x = -8$ and $x = 5$.

1. $f(x) = \begin{cases} 2x & \text{if } x < 0 \\ 0 & \text{if } x \geq 0 \end{cases}$

____

2. $g(x) = \begin{cases} 2 - x & \text{if } x \leq 5 \\ -x^2 & \text{if } 5 < x < 8 \\ 6 & \text{if } 8 \leq x \end{cases}$

____

3. $h(x) = \begin{cases} 2x + 4 & \text{if } x \leq -8 \\ -1 & \text{if } -8 < x < 5 \\ x^2 & \text{if } 5 \leq x \end{cases}$

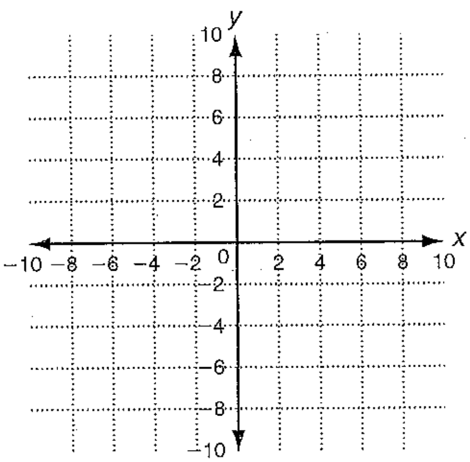
____

4. $k(x) = \begin{cases} 15 & \text{if } x \leq -5 \\ x & \text{if } -5 < x < 1 \\ 7 - \frac{x}{2} & \text{if } 1 < x \end{cases}$

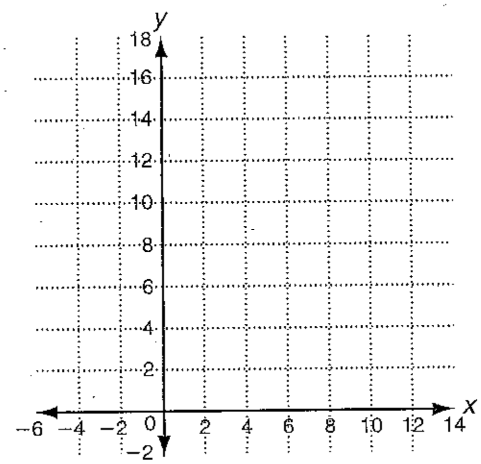
____

Graph each function.

5. $f(x) = \begin{cases} 6 & \text{if } x < -2 \\ 3x & \text{if } -2 \leq x \end{cases}$



6. $g(x) = \begin{cases} 12 - x & \text{if } x \leq 5 \\ x + 2 & \text{if } 5 < x \end{cases}$



Solve.

7. An airport parking garage costs \$20 per day for the first week. After that, the cost decreases to \$17 per day.

a. Write a piecewise function for the cost of parking a car for x days. _______________________

b. What is the cost to park for 10 days? _______________________

c. Ms. Anderson went on two trips. On the first, she parked at the garage for 5 days; on the second, she parked at the garage for 8 days. What was the difference in the cost of parking between the two trips? _______________________

Name ______________________ Date __________ Class __________

TEKS 2A.1.A

LESSON 9-2

Practice B

Piecewise Functions

Evaluate each piecewise function for $x = -8$ and $x = 5$.

1. $f(x) = \begin{cases} 2x & \text{if } x < 0 \\ 0 & \text{if } x \geq 0 \end{cases}$

____

2. $g(x) = \begin{cases} 2 - x & \text{if } x \leq 5 \\ -x^2 & \text{if } 5 < x < 8 \\ 6 & \text{if } 8 \leq x \end{cases}$

____

3. $h(x) = \begin{cases} 2x + 4 & \text{if } x \leq -8 \\ -1 & \text{if } -8 < x < 5 \\ x^2 & \text{if } 5 \leq x \end{cases}$

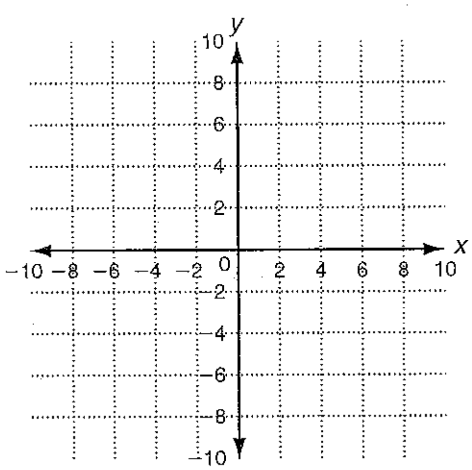
____

4. $k(x) = \begin{cases} 15 & \text{if } x \leq -5 \\ x & \text{if } -5 < x < 1 \\ 7 - \frac{x}{2} & \text{if } 1 < x \end{cases}$

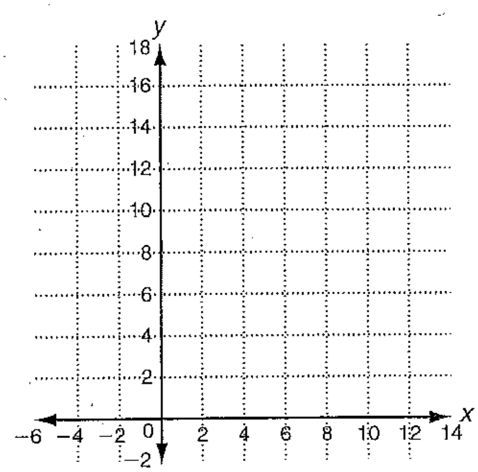
____

Graph each function.

5. $f(x) = \begin{cases} 6 & \text{if } x < -2 \\ 3x & \text{if } -2 \leq x \end{cases}$



6. $g(x) = \begin{cases} 12 - x & \text{if } x \leq 5 \\ x + 2 & \text{if } 5 < x \end{cases}$



Solve.

7. An airport parking garage costs \$20 per day for the first week. After that, the cost decreases to \$17 per day.

a. Write a piecewise function for the cost of parking a car for x days. _______________

b. What is the cost to park for 10 days? _______________

c. Ms. Anderson went on two trips. On the first, she parked at the garage for 5 days; on the second, she parked at the garage for 8 days. What was the difference in the cost of parking between the two trips? _______________

Continuity and Piecewise Functions Name: ______________________________

Now that you're in calculus class, you're always seeing the math wherever you go. Just the other day, you were at Safeway, where they were trying to sell some extra avocadoes, so they had a promotion going on. "Buy 4 avocadoes for $1.98 a piece, and get each one after that for half off. Limit: 10 avocadoes per customer."

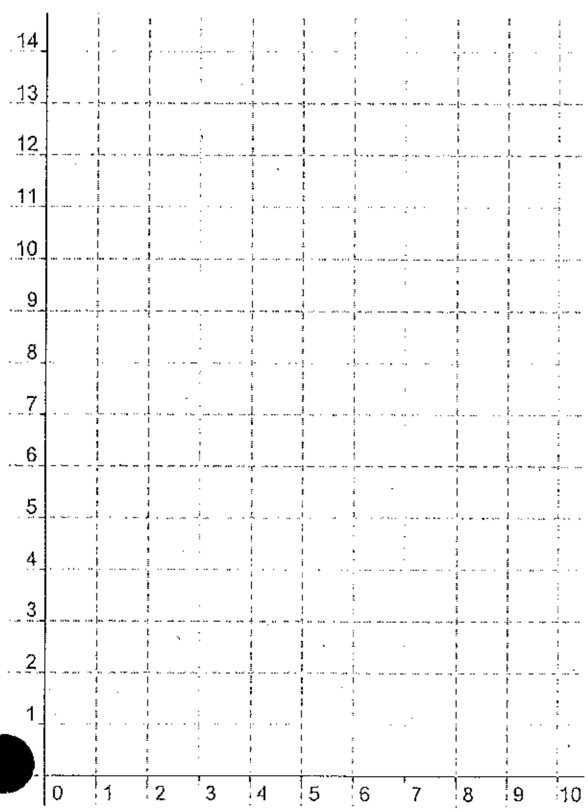
"Wait a minute!" you shouted. "The price of avocadoes is a piecewise function." You are very clever. You scare the other shoppers at Safeway a little bit, but you are very clever.

Of course, right away you wanted to write a function definition for your piecewise function, but you felt a little bit stuck, so you decided to start with a table.

Number of Avocadoes	1	2	3	4	5	6	7	8	9	10
Total Cost										

Before you go any further, be aware that Safeway employees have been trained laugh at you when you ask to buy a part of an avocado. Describe the domain of your function:

There's a grocery store down the street (Real Groceries) that will cut the avocadoes and sell you any fraction (or irrational piece) of an avocado. Otherwise, the price is identical at both stores. Describe the domain of the function at Real Groceries:



Use the grid to graph the total cost of avocadoes vs. number of avocadoes at Real Groceries.

Is the cost of avocadoes at Safeway continuous?

Why or why not?

Is the cost of avocadoes at Real Groceries continuous?

Why or why not?

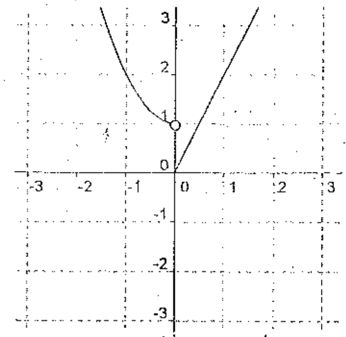
Now, you're finally ready! Write the piecewise function for the cost of avocadoes at Real Groceries:

$$C(a) = \left\{ \right.$$

Check in with your neighbors before you move on...

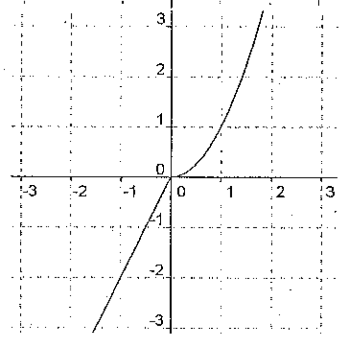
Write the name of the piecewise function next to its graph:

$$f(x) = \begin{cases} 2x \text{ for } x \le 0 \\ x^2 \text{ for } x > 0 \end{cases}$$



____

$$g(x) = \begin{cases} 2x \text{ for } x \ge 0 \\ x^2 \text{ for } x < 0 \end{cases}$$



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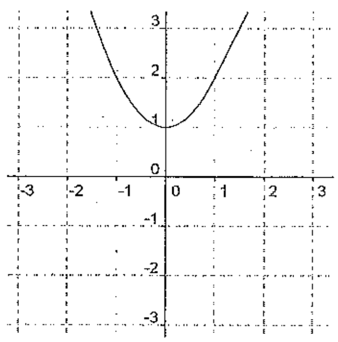
$$h(x) = \begin{cases} 2x \text{ for } x \ge 0 \\ x^2+1 \text{ for } x < 0 \end{cases}$$



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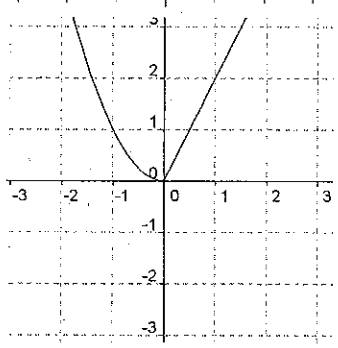
$$k(x) = \begin{cases} 2x \text{ for } x \ge 1 \\ x^2+1 \text{ for } x < 1 \end{cases}$$



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Which of the functions is *not* continuous?

Explain how you can tell from the graph whether a piecewise function is continuous.

Explain how you can tell from the function definition whether a piecewise function is continuous. Don't continue until you have a good method.

OK, now. You've bought avocadoes at a Real Grocery store. You've matched graphs to piecewise functions. It's time for the biggest challenge of all. Pick your favorite number from the set of numbers {1, 2, 3, 4, 5}. Write it down.

______

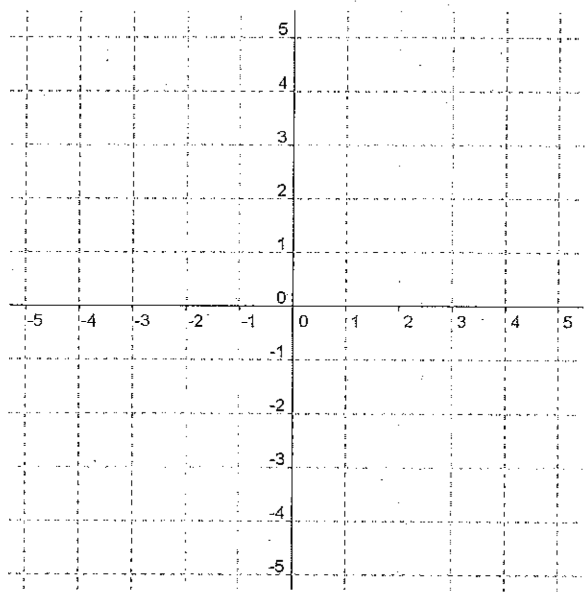
For the next problem *k* stands for your favorite number (written above), and g(x) is the piecewise function defined below.

$$g(x)=\begin{cases}0.5x \text{ for } x \geq 2\\ x^2-k \text{ for } x<2\end{cases}$$

Graph g(x).

Is g(x) continuous?

For what value of k would g(x) be continuous?



For each of the following problems find the value of the constant k that would make h(x) continuous.

$$h(x)=\begin{cases}\sin x \text{ for } x \geq 0\\ \cos x+k \text{ for } x<0\end{cases}$$
k = ______

$$h(x)=\begin{cases}x^2+k \text{ for } x \leq 2\\ x^3 \text{ for } x>2\end{cases}$$
k = ______

$$h(x)=\begin{cases}x^3-2x-5 \text{ for } x<2\\ x^2+x+k \text{ for } x \geq 2\end{cases}$$
k = ______

$$h(x)=\begin{cases}2x^2 \text{ for } x \geq -1\\ kx \text{ for } x<-1\end{cases}$$
k = ______

Write a description in words of how you approached these problems.