

Assignment

Write

Explain the basic absolute value function using the definition of a linear piecewise function.

Remember

A linear piecewise function is a function that can be represented by linear functions, each of which corresponds to a part of the domain. To write a linear piecewise function, you must write the linear equation and domain for each part of the function.

Practice

1. Jin fills up a 510-gallon pool in the backyard for her children. She fills it with the garden hose at a rate of 17 gallons per minute. After it is filled, she lets it sit for 30 minutes in order to let the water temperature rise. The children then get in and have fun for an hour. The pool loses about $\frac{1}{2}$ gallon of water each minute due to their splashing and playing. At the end of the hour, they tear the pool while getting out, which causes a leak. The pool then begins to lose water at a rate of 2 gallons per minute.

- Complete the table to show the amount of water in the pool after each minute.
- Create a graph to model the problem situation. Include when the pool will be empty.
- Write a piecewise function that models this problem situation. Explain your reasoning for each piece of the function.
- Identify the x - and y -intercept. Explain what they mean in terms of the problem situation.
- Determine when the pool will have 470 gallons of water in it. Identify the piece(s) of function you used. Explain your reasoning.

Time (minutes)	Amount of Water (gallons)
0	
5	
20	
30	
45	
60	
80	
100	
120	
150	
200	

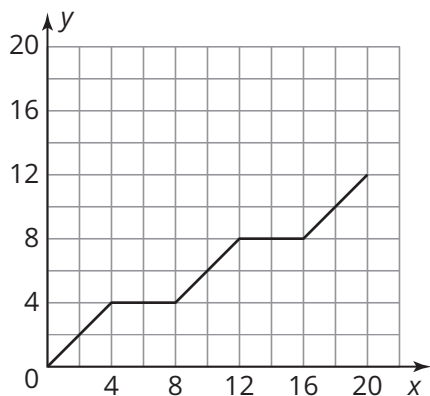
2. Jin asks her children to pay her back for the damaged pool. They must give her \$15 per week. Together they have \$165 in a savings account.

- Write a function to represent the amount of money they have after x weeks. Describe the domain and range of this function in terms of the problem situation.
- To rebuild their account, the children will receive a combined \$15 per week in allowances. They start saving the week after their account is depleted and save for another 11 weeks. What are the domain and range of this function and what do they mean in terms of the problem situation? Write a function to represent this part of the graph.
- Graph the equations on the same grid. Is the graph continuous or discrete? Explain your reasoning.
- Write a function to represent the entire graph.

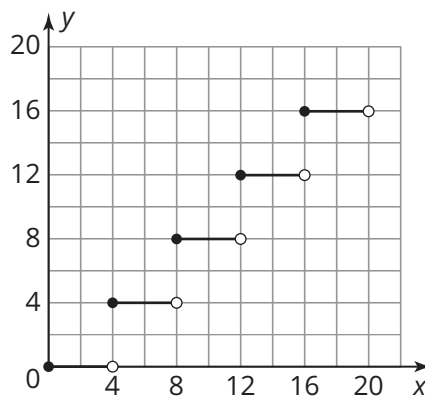
Stretch

The graphs of two linear piecewise functions are shown.

Graph A



Graph B



1. Describe the similarities and differences in the two graphs.
2. Determine the value of $f(x)$ for each graph when $x = 8$.
3. Determine the value of $f(x)$ for each graph when $x = 18$.
4. Write the piecewise functions for each graph.

Review

1. Lucia and Danna both recently purchased fitness watches. The watches count the number of steps they walk in a day. At lunchtime, Lucia has 5,445 steps and Danna has 4,995 steps. Lucia averages 800 steps per hour and Danna averages 900 steps per hour.
 - a. Write and solve a system of linear equations that represent the total number of steps each person takes.
 - b. Interpret the meaning of the solution in terms of the problem situation.
2. The Me-OW Company sells cat food in bags labeled *13 pounds*. The quality control manager is in charge of making sure the bags get filled properly. To be labeled *13 pounds*, a difference of no more than 0.15 pound is acceptable.
 - a. Write an absolute value inequality to represent the restrictions on the difference in the weight of the bag.
 - b. Determine the greatest and least amount of cat food a bag can contain and still fall within the required specifications. Write your answer as an inequality.
3. Calculate the average rate of change for the function $f(x) = 2x - 2$ from $x_1 = 5$ to $x_2 = 11$.