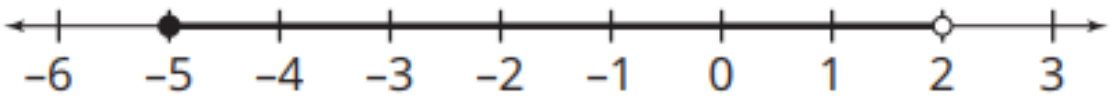
Warm Up



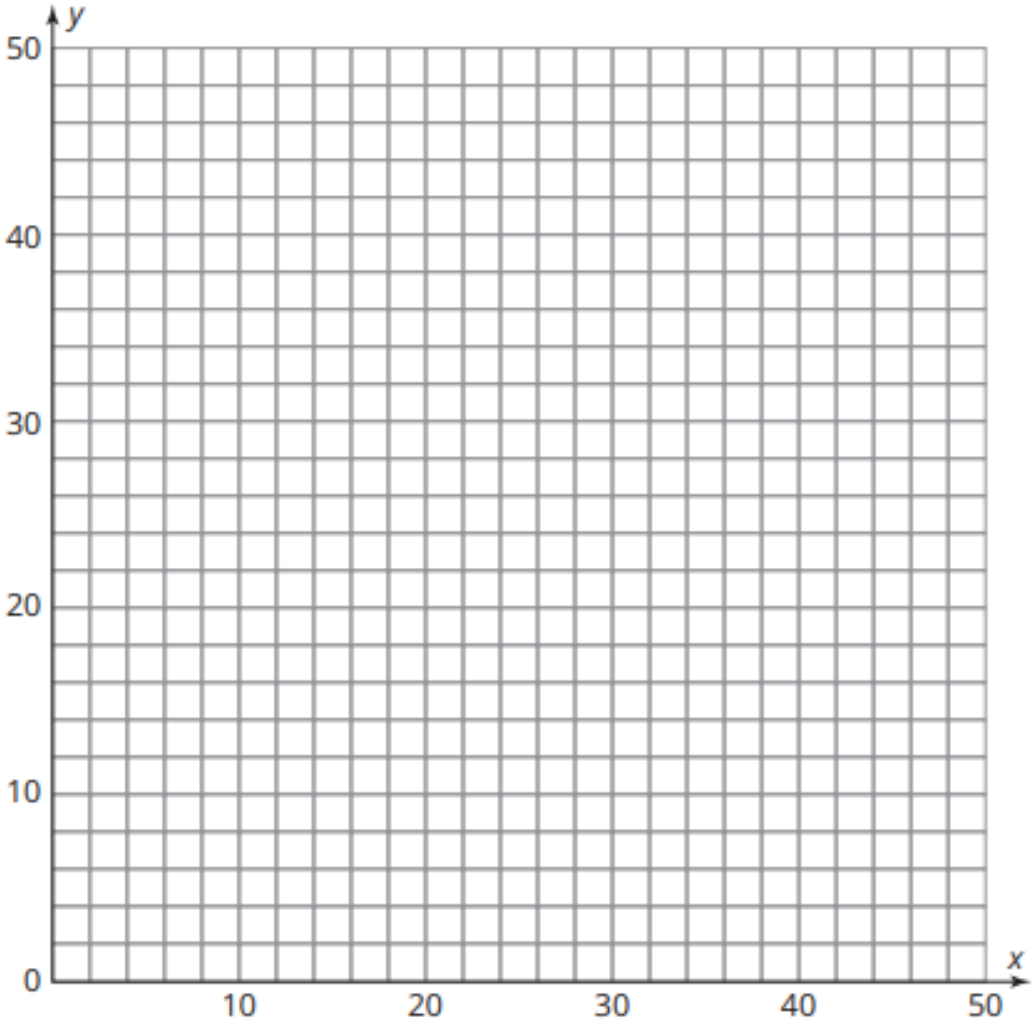
1. What is the significance of the open and closed endpoints in this graph?

A High-Five for Height

At Adventure Village, there are minimum height requirements to determine if children can safely enjoy the rides.

- There are 22 rides any child can ride regardless of their height, although an adult must accompany the child for some rides.
- There are 10 additional rides that a child must be at least 36 inches tall to ride.
- There are 12 additional rides that a child must be at least 46 inches tall to ride.

1. **Identify the independent and dependent quantities in this scenario.**



2. **Use the scenario to graph the function. Label the axes.**

3. **Determine the number of rides a child is eligible to ride for each height.**

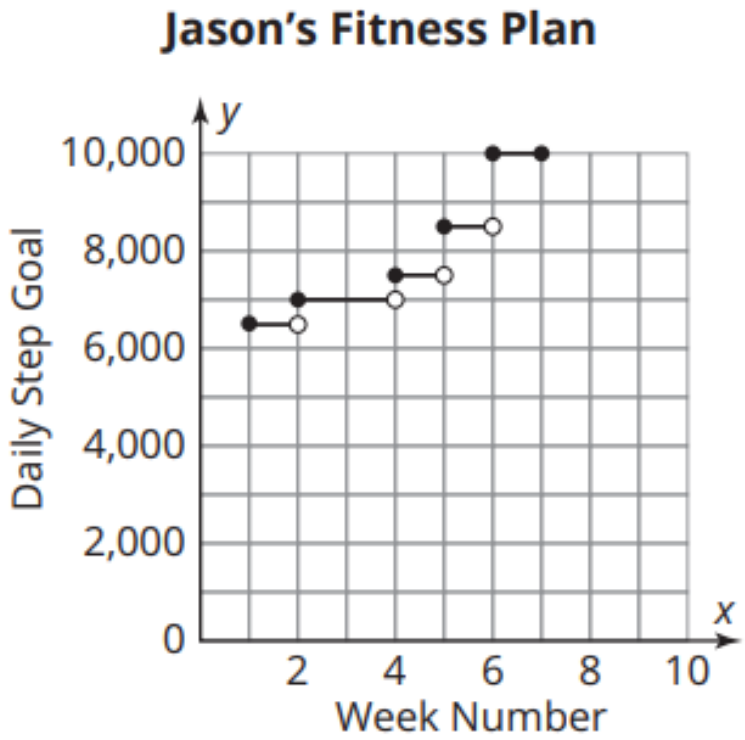
   a. **36 inches**

   b. **$45\frac{15}{16}$ inches**

   c. **46 inches**

4. **How is this graph similar to the graphs in the previous lesson? How is it different?**

Taking 10,000 steps per day is a popular fitness goal for individuals striving for a more active lifestyle. Jason has a fitness tracker, and developed a program where he plans to increase the number of steps he takes each day until he reaches his goal of 10,000 steps per day. Jason set a daily step goal for each week, Sunday through Saturday. He recorded his plan in the graph shown.



1. **Use the graph and scenario to answer each question.**

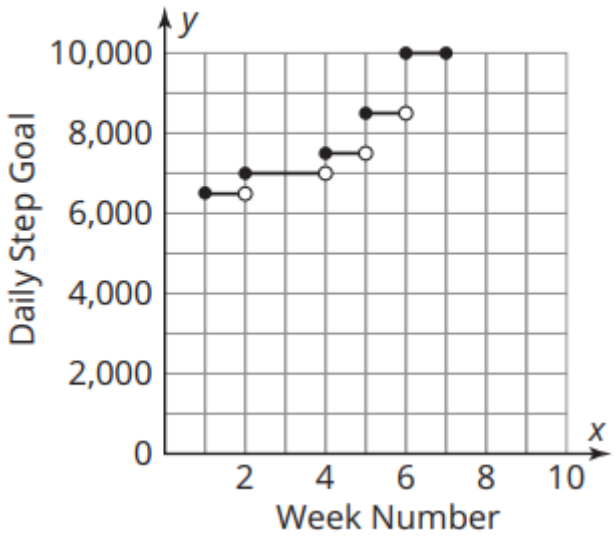
   a. **When does Jason plan to reach his goal of 10,000 steps per day?**

   b. **Why does the graph start at $x = 1$?**

   c. **On what day(s) is Jason's goal to walk 8000 steps?**

   d. **Why do you think one piece of the graph has closed circles on both of its ends?**

Jason's Fitness Plan



2. Consider the graph at $x = 2$.

   a. What is $f(2)$?

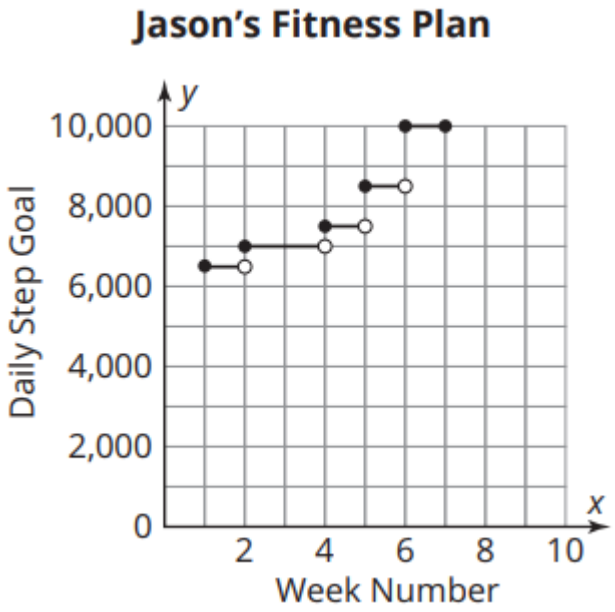
   b. Explain what is happening in the scenario right before $x = 2$.

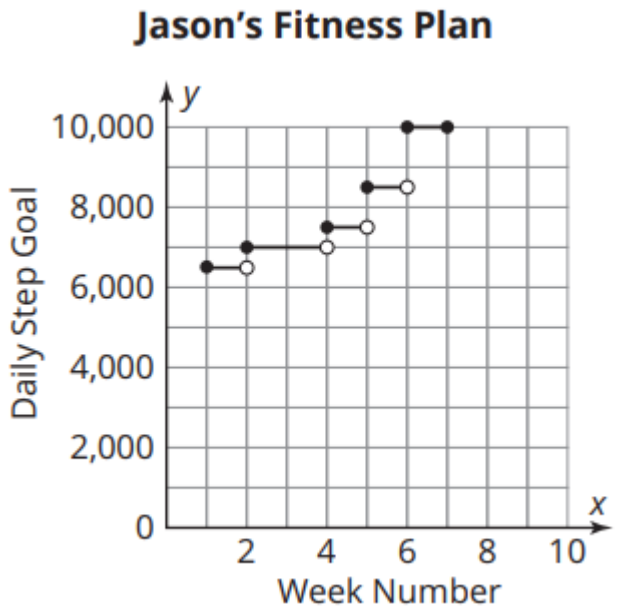
3. Consider the graph at $f(x) = 7000$.

   a. What is the value of x?

   b. Explain what is happening in the scenario when $f(x) = 7000$.

4. Write a piecewise function to represent this graph and scenario.

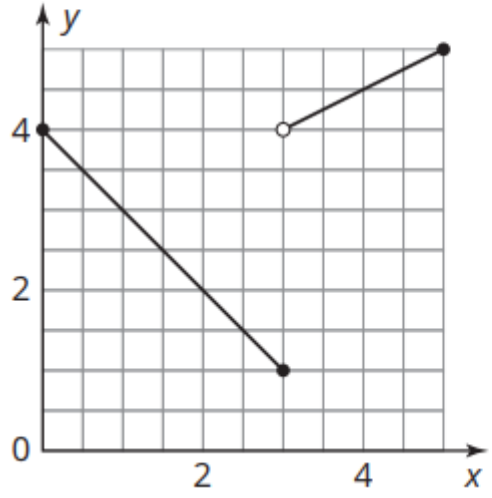




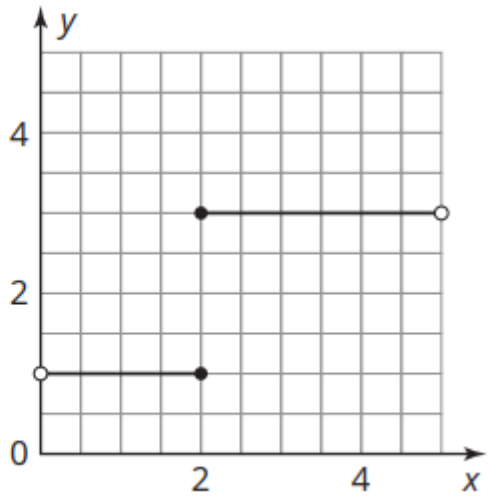
This graph and the piecewise graph in the previous activity are neither discrete nor continuous. They are *discontinuous*. A **discontinuous graph** is a graph that is continuous for some values of the domain with at least one disjoint area between consecutive *x*-values.

5. **Consider the examples of discontinuous graphs. Which graph(s) represent functions? Use the definition of *function* to justify your response.**

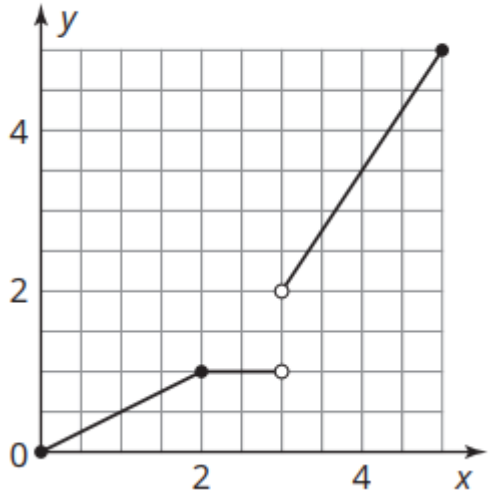
Graph A



Graph B



Graph C



Jason's Fitness Plan graph represents a specific discontinuous function, a *step function*. A **step function** is a piecewise function on a given interval whose pieces are discontinuous constant functions.

6. **How do you think step functions got their name?**