

Lesson Summary

Functions are classified as either discrete or not discrete.

Discrete functions admit only individually separate input values (such as whole numbers of students, or words of the English language). Functions that are not discrete admit any input value within a range of values (fractional values, for example).

Functions that describe motion or smooth changes over time, for example, are typically not discrete.

Problem Set

1. The costs of purchasing certain volumes of gasoline are shown below. We can assume that there is a linear relationship between x , the number of gallons purchased, and y , the cost of purchasing that many gallons.

Number of gallons (x)	5.4	6	15	17
Total cost in dollars (y)	19.71	21.90	54.75	62.05

- Write an equation that describes y as a linear function of x .
 - Are there any restrictions on the values x and y can adopt?
 - Is the function discrete?
 - What number does the linear function assign to 20? Explain what your answer means.
2. A function has the table of values below. Examine the information in the table to answer the questions below.

Input	Output
one	3
two	3
three	5
four	4
five	4
six	3
seven	5

- Describe the function.
- What number would the function assign to the word *eleven*?

3. The table shows the distances covered over certain counts of hours traveled by a driver driving a car at a constant speed.

Number of hours driven (x)	3	4	5	6
Total miles driven (y)	141	188	235	282

- Write an equation that describes y , the number of miles covered, as a linear function of x , number of hours driven.
 - Are there any restrictions on the value x and y can adopt?
 - Is the function discrete?
 - What number does the function assign to 8? Explain what your answer means.
 - Use the function to determine how much time it would take to drive 500 miles.
4. Consider the function that assigns to each time of a particular day the air temperature at a specific location in Ithaca, NY. The following table shows the values of this function at some specific times.

12:00 noon	92°F
1:00 p.m.	90.5°F
2:00 p.m.	89°F
4:00 p.m.	86°F
8:00 p.m.	80°F

- Let y represent the air temperature at time x hours past noon. Verify that the data in the table satisfies the linear equation $y = 92 - 1.5x$.
- Are there any restrictions on the types of values x and y can adopt?
- Is the function discrete?
- According to the linear function of part (a), what will the air temperature be at 5:30 p.m.?
- Is it reasonable to assume that this linear function could be used to predict the temperature for 10:00 a.m. the following day or a temperature at any time on a day next week? Give specific examples in your explanation.