Continuous Quantitative Variables

GOAL
Understand the use of continuous quantitative variables.

Learn about the Math

In the previous lesson, you learned about variables that are measured in terms of numbers, called quantitative variables. You also saw that some quantitative variables have possible values of only discrete points on a scale. These are called discrete quantitative variables.

A second type of quantitative variable is called a **continuous variable**. This is a variable where the scale is continuous and not made up of discrete steps.

For example, if playing a game of trivia, the length of time it takes a player to give an answer might be represented by a continuous variable. If it takes a player 1.64 s to give an answer, this would be the value of that variable. The values of a continuous variable are not limited to specific points on a scale.

Angele wants to determine the average high temperature for the month of September in Québec City. The following chart shows the temperatures she recorded for the first week of September. Angele knows that her data is quantitative, since temperatures are measured in terms of numbers.

You will need
- grid paper
- a ruler
<table>
<thead>
<tr>
<th>Date</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>15.6</td>
</tr>
<tr>
<td>2nd</td>
<td>12.4</td>
</tr>
<tr>
<td>3rd</td>
<td>13.5</td>
</tr>
<tr>
<td>4th</td>
<td>14.5</td>
</tr>
<tr>
<td>5th</td>
<td>12.8</td>
</tr>
<tr>
<td>6th</td>
<td>15.1</td>
</tr>
<tr>
<td>7th</td>
<td>14.9</td>
</tr>
</tbody>
</table>

**Is Angele's temperature data a discrete quantitative variable or a continuous quantitative variable?**

**Example 1: Determining if a quantitative variable is discrete or continuous**

Is Angele’s temperature data a discrete or continuous quantitative variable?

**Li Ming’s Solution**

I can determine if a quantitative variable is discrete or continuous, by referencing the definitions for these two terms. A discrete variable is a variable with possible values of only specific points on a scale. A continuous variable is a variable where the scale is continuous and not made up of discrete steps. The values between the temperatures have meaning.

Angele’s temperature data is continuous.

**Reflecting**

1. What is a continuous quantitative variable?

2. What is the difference between a discrete quantitative variable and a continuous quantitative variable?

3. Give an example of a continuous quantitative variable.
Example 2: Determining if a quantitative variable is discrete or continuous

Determine if each of the following quantitative variables is discrete or continuous.

a) amount of time it takes to run a 400 m sprint
b) shoe size

Li Ming’s Solution

a) This is a continuous variable, because the length of time can be broken into parts.
b) Shoe size is a discrete variable. Only values at specific points such as whole or half sizes would be used.

A Checking

4. Rodrigo polled his class on their favourite type of music. He listed five different kinds of music and asked his classmates to rank them in order from 1 to 5, with 1 being their favourite and 5 being their least favourite. Would these values be discrete or continuous?

B Practising

5. Fill in the blank with a word that will make each statement true.

a) A ___________ quantitative variable is a variable where the scale is not made up of discrete steps.

b) The number of children in a household is an example of a ___________ quantitative variable.

c) Eye color is an example of a ___________ variable.

d) ___________ variables are variables measured in terms of numbers.
6. Determine if each of the following quantitative variables is discrete or continuous.
   a) height
   b) number of students in a class
   c) time it takes to answer a question in a trivia game
   d) class average
   e) number of flowers in a vase
   f) ranking of 8 runners in a 100 m race

7. Determine if each of the following statements is true or false.
   a) A quantitative variable always involves numbers.
   b) A continuous variable is a variable where the scale is made up of discrete steps.
   c) A discrete variable is a variable with possible values of only specific points on the scale.

8. Is the number of students on each team for field-day events a discrete quantitative variable or a continuous quantitative variable?

9. The times for the school relay event were recorded in the following table:

    | Team Name   | Relay Time |
    |-------------|------------|
    | Red Team    | 1.896 min  |
    | Blue Team   | 1.945 min  |
    | White Team  | 2.248 min  |
    | Black Team  | 2.897 min  |

Are these values a discrete quantitative variable or a continuous quantitative variable?

10. The following chart gives the amount of precipitation over the past 12 months for Québec City.

    | Month       | Precipitation (mm) |
    |-------------|--------------------|
    | January     | 84.8               |
    | February    | 74.8               |
    | March       | 78.8               |
    | April       | 76.0               |
    | May         | 92.8               |
    | June        | 107.9              |
    | July        | 111.8              |
    | August      | 108.5              |
    | September   | 112.6              |
    | October     | 88.8               |
    | November    | 100.0              |
    | December    | 104.2              |

Determine if the variable for the amount of precipitation is a qualitative variable, a discrete quantitative variable, or a continuous quantitative variable. Then create a bar graph to display the data.