QUESTION 1 OF 2 For each variable below, identify each as either quantitative or categorical. Categorical Categorical Quantitative Quantitative Quantitative VARIABLE DATA TYPE Zip Code Categorical Age Quantitative Income Quantitative Marital Status (Single, Married, Divorced, etc.) Categorical Height Quantitative

QUESTION 2 OF 2 For each variable below, identify each as either quantitative or categorical. Categorical Quantitative Categorical Quantitative Quantitative VARIABLE DATA TYPES Letter Grades (A+, A, A-, B+, B, B-, ...) Categorical Travel Distance to Work Quantitative Ratings on a Survey (Poor, Ok, Great) Categorical Temperature Quantitative Quantitative Average Speed

Text:

Recap of Previous Video

The table below summarizes our data types. To expand on the information in the table, you can look through the text that follows.

Data Types		
Quantitative:	Continuous	Discrete
	Height, Age, Income	Pages in a Book, Trees in Yard, Dogs at a Coffee Shop
Categorical:	Ordinal	Nominal
	Letter Grade, Survey Rating	Gender, Marital Status, Breakfast Items

Below is a little more detail of the information shared in the above table.

Another Look

To break down our data types, there are two main blocks:

Quantitative and Categorical

Quantitative can be further divided into Continuous Or Discrete.

Categorical data can be divided into Ordinal or Nominal.

You should have now mastered what types of data in the world around us falls into each of these four buckets: Discrete, Continuous, Nominal, and Ordinal. In the next sections, we will work through the numeric summaries that relate specifically to quantitative variables.

Quantitative vs. Categorical

Some of these can be a bit tricky - notice even though zip codes are a number, they aren't really a quantitative variable. If we add two zip codes together, we do not obtain any useful information from this new value. Therefore, this is a categorical variable.

Height, **Age**, the **Number of Pages in a Book** and **Annual Income** all take on values that we can add, subtract and perform other operations with to gain useful insight. Hence, these are quantitative.

Gender, **Letter Grade**, **Breakfast Type**, **Marital Status**, and **Zip Code** can be thought of as labels for a group of items or individuals. Hence, these are categorical.

Continuous vs. Discrete

To consider if we have continuous or discrete data, we should see if we can split our data into smaller and smaller units. Consider time - we could measure an event in years, months, days, hours, minutes, or seconds, and even at seconds we know there are smaller units we could measure time in. Therefore, we know this data type is continuous. **Height**, **age**, and **income** are all examples of continuous data. Alternatively, the **number of pages in a book**, **dogs I count outside a coffee shop**, or **trees in a yard** are discrete data. We would not want to split our dogs in half.

Ordinal vs. Nominal

In looking at categorical variables, we found **Gender**, **Marital Status**, **Zip Code** and your **Breakfast items** are nominal variables where there is no order ranking associated with this type of data. Whether you ate cereal, toast, eggs, or only coffee for breakfast; there is no rank ordering associated with your breakfast. Alternatively, the **Letter Grade** or **Survey Ratings** have a rank ordering associated with it, as ordinal data. If you receive an A, this is higher than an A-. An A- is ranked higher than a B+, and so on... Ordinal variables frequently occur on rating scales

from very poor to very good. In many cases we turn these ordinal variables into numbers, as we can more easily analyze them, but more on this later!

Final Words

In this section, we looked at the different data types we might work with in the world around us. When we work with data in the real world, it might not be very clean - sometimes there are typos or missing values. When this is the case, simply having some expertise regarding the data and knowing the data type can assist in our ability to 'clean' this data. Understanding data types can also assist in our ability to build visuals to best explain the data. But more on this very soon!

QUIZ QUESTION
This quiz will assure you have a clear understanding of the differences between categorical nominal vs. categorical ordinal variables. All of the variables below are categorical. Your task is to select the check box next to each variable that is nominal ; do not check the ordinal categorical variables.
Letter Grades (A, B+, B, B-, etc.)
Types of Fruit (Apple, Banana, etc.)
Ratings on a Survey (Poor, Ok, Great)
Types of Dog Breeds (German Shepherd, Collie, etc.)
Genres of Movies (Horror, Comedy, etc.)
Gender
Nationality
Education (HS, Associates, Bachelors, Masters, PhD, etc.)

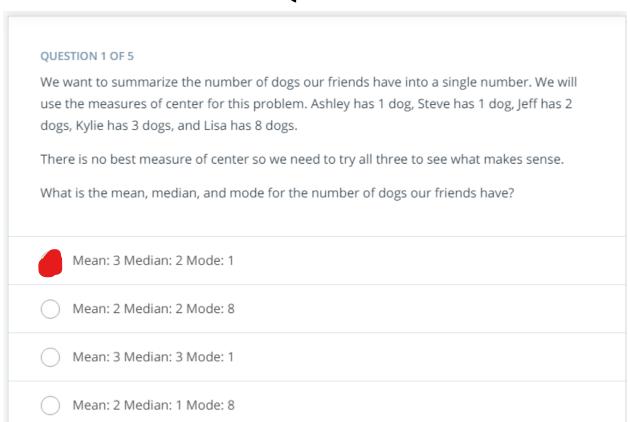
QUIZ QUESTION This quiz will ensure you have a clear understanding of the differences between quantitative continuous vs. discrete variables. All of the variables below are quantitative. Your task is select the check box next to each variable that is continuous; do not check the discrete variables.
Travel Distance from Home to Work
Number of Pages in a Book
Amount of Rain in a Year
Time to Run a Mile
Number of Movies Watched in a Week
Amount of Water Consumed in a Day
Number of Phones per Household

QUESTION 1 OF 2 Which of the below are measures of center (Check all that apply)?
Mean
Standard Deviation
Variance
Median
Inter-quartile Range
Mode
Range
Maximum
Minimum

QUESTION 2 OF 2 If we have the data:
5, 8, 15, 7, 10, 22, 3, 1, 15
What is the mean?
what is the mean?
O 7
9.56
<u> </u>
O 8
O 8.5

QUESTION 1 OF 2
If we have the data:
5, 8, 15, 7, 10, 22, 3, 1, 15
What is the median?
O 7
9.56
<u></u>
a 8
· ·
7.5

QUESTION 2 OF 2 If we have the data:	
5, 8, 15, 7, 10, 22, 3, 1, 15, 2	
What is the median?	
O 7	
9.56	
<u> </u>	
<u> </u>	
7.5	



QUESTION 2 OF 5 Check all of the below that are true with regards to our measures of center.
The mode is the middle number in the dataset when the numbers are rank ordered.
The median is the middle number in the dataset when the numbers are rank ordered.
The mean is always the best measure of center for any dataset.
The mean is always less than the median.
The median is always the best measure of center for any dataset.
The mode is always the best measure of center for any dataset.
QUESTION 3 OF 5 If we have the data: 5, 8, 15, 7, 10, 22, 3, 1, 15 What is the mode?
9.56
<u> </u>
15
<u> </u>

QUESTION 4 OF 5

For the dataset below match the correct measure to the value:

8, 12, 32, 10, 3, 4, 4, 4, 4, 5, 12, 20

9.83	6.5	4	8
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MEASURE	VALUE
Mean	9.83
Median	6.5
Mode	4
None of the Above	8

Text:

Example Dataset

An example of the data we might have collected in the previous video is shown here:

June 15Thursday5NoJune 15Thursday10YesJune 16Friday20Yes
June 16 Friday 20 Yes
What type of variable is the random variable X in the video in the previous co Categorical - Ordinal
Categorical - Nominal
Quantitative - Continuous
Quantitative - Discrete

QUESTION 2 OF 2 What type of variable is the random variable Y in the video in the previous concept?
Categorical - Ordinal
Categorical - Nominal
Quantitative - Continuous
Quantitative - Discrete

Text:

Consider we have the following table:

X	у	Z
Years Experience	Department	Part/Full Time
5	IT	Part Time
10	Finance	Full Time
8	HR	Full Time
1	Finance	Part Time

Consider we have the following labels:

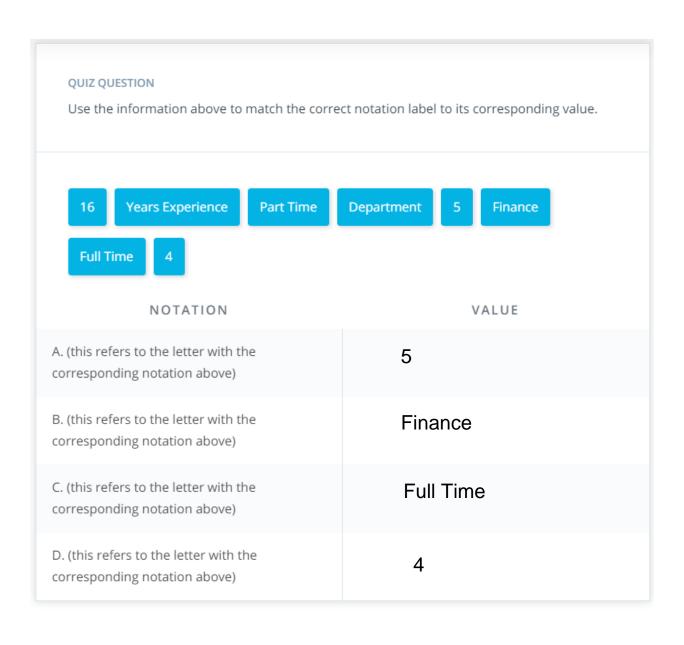
 $\bold{X}X=$ years of experience

\bold{Y}**Y**= Department

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Match the following notation to their corresponding:

- A. $\bold{x_1}x_1$
- B. $\bold{y_2}$
- C. $\bold{z_3}$ **z**₃
- $\mathsf{D.} \setminus bold\{n\} \boldsymbol{n}$



Text:

Match The Notation

For this quiz, you will be matching the notation attached the letters below to the corresponding numeric value to make sure you understand exactly what is being done with each part of the notation.

Imagine, we have the following table of values:

\mathbf{x}_1	\mathbf{x}_2	\mathbf{x}_3	\mathbf{x}_4	\mathbf{x}_5	\mathbf{x}_6	\mathbf{x}_7
5	15	3	3	8	10	12

B.
$$\sum\limits_{i=1}^n x_i$$

C.
$$\sum\limits_{j=2}^{7}x_j+6$$

$$\text{E. } \frac{\sum\limits_{i=3}^{6}x_{i}}{n-1}$$

QUIZ QUESTION Use the letters, numbers, and notation as defined above to match each letter to the appropriate value. 15 7 56 57 8 4 LETTER VALUE Α. 7 В. 56 C. 57 D. 8 E. 4

Notation for Quizzes

For the below quiz, let the following letters denote the corresponding notation:

- A. \mathbf{X}
- в. **Y**
- C. $\mathbf{x_1}$
- $\mathsf{D.}\ \mathbf{n}$
- $\text{E. } \sum_{i=1}^n x_i$

			N		

Use the letter next to the notation above to match the notation to the description of what the notation represents.

The notation for all of the values in our dataset.

The notation for all of the values in our dataset.

The notation for the number of columns in our dataset.

The notation for a random variable.

The notation for a random variable.

The notation for the first observed value of a random variable.

The notation for the number of rows in our dataset.

The notation for the sum of all the values in our dataset.

NOTATION LETTER

DESCRIPTION

А	The notation for a random variable	assigning a column a random variable that can have many values when notated in lowercase with a subscript
В	The notation for a random variable	assigning a column a random variable that can have many values when notated in lowercase with a subscript
С	the notation for the first observed value of a random variable	The value of the first element in the row
D	the notation for the number of rows in out dataset	the number of rows in a column
Е	The notation for the sum of all the values in out data base	notates the sum of a specific number of values instead of writing them down all

Notation for Quizzes

For the below quiz, let the following letters denote the corresponding notation:

- A. $\sum\limits_{i=1}^{n}x_{i}$
- $\text{B.} \quad \frac{\sum\limits_{i=1}^{n}x_{i}}{n}$
- C. $\bar{\mathbf{x}}$
- D. $\bar{\mathbf{y}}$
- $\mathsf{E.} \quad \frac{\sum\limits_{j=1}^n y_j}{n}$

QUESTION 2 OF 2

If we wanted to provide notation for the mean of a particular dataset, which of the following letters would correspond to the notation attached to calculating the mean? (Mark all that apply.)

- A
- В
- C

,



D

____ E