

# **Team Trivia Review Exam 1**

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- Every team has a chance at every question.
- I will read the question and show it on the slide, and then teams have between 90 seconds and 2 minutes to discuss and turn in their answer to me.
- I will grade only answers submitted by the deadline.
- *Round all values to two decimal places (hundredths) at each step. You do not have to show your work.*
- Please keep your voices down as you discuss the questions and discuss only the trivia questions during this class period.
- *After time is up, I will explain the answer. Please do not talk during this time. Even if **you** knew the answer, keep in mind that not everyone did; also, even if you knew it, you might benefit from additional explanation.*
- If you have a question, please raise your hand and ask it so that all teams will hear your question and my answer.
- Teams will keep score on the board. 1 pt per correct answer, unless otherwise noted.
- At the end of the class period, the teams will be ranked. The top-scoring team will earn 4 EC points per student, 2<sup>nd</sup> place=3 points, and 3<sup>rd</sup> place =2 points. I will record these points on Moodle, separately from your exam 1 score.

# Rules

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# Round 1

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90 secs

60 secs

30 secs

15 secs

5 secs

You've been hired by the local school system to determine the relationship between absences and grades. For each student, you count the number of times they were absent during the semester and record their final semester grade (on a 1 to 100% scale).

**What kind of research design was used – correlational or experimental?**

# Question 1

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- Correlational
  - Two variables were *measured* (absences, grades); none were *manipulated*

## Question 1 - answer

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90 secs

60 secs

30 secs

15 secs

5 secs

A researcher wants to know if the part of the country where you grew up (northeast, midwest, south, or west) relates to your support for same-sex marriage on a scale from 1-*strongly oppose* to 10-*strongly support*.

Assume that location where a person grew up is the predictor variable, and support for same-sex marriage is the outcome variable.

**How would a psychology researcher classify the predictor and outcome variables – as qualitative or quantitative?**

Correct answers for both are required for credit.

## Question 2

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- The predictor is *location where you grew up* (northeast, midwest, south, west).
  - The four locations are more like *qualities* than *values*, making this a *qualitative* variable.
  - You can also think of those locations as *categories*, not values.
- The outcome variable is *support for same-sex marriage*, measured on a scale from 1-*strongly oppose* to 10-*strongly support*.
  - Numeric scales such as these are typically treated as *quantitative* variables.

## Question 2 - answer

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90 secs

60 secs

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15 secs

5 secs

An experiment compared the gun control support (on a scale from 1 = *do not support gun control* to 5 = *strongly support gun control*) of people who were made to feel afraid vs. people who were made to feel angry vs. people who were kept in a neutral mood.

**What are the levels of your independent variable, and is your independent variable qualitative or quantitative?**

Both answers must be correct to earn credit.

## Question 3

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- There are 3 levels/conditions of the independent variable (which is *emotion*):
  1. **Feeling afraid**
  2. **Feeling angry**
  3. **Neutral mood**
- The independent variable, emotion, is a *qualitative* variable.
  - TIP: the IV will always be *qualitative*.

## Question 3 - answer

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90 secs

60 secs

30 secs

15 secs

5 secs

You and several friends are training for a marathon. You're trying to see if you can improve your time by doing some track work, so you set up a track workout program over six weeks.

You all measure your performance on the 400 meter dash at the beginning of the six weeks, and then again at the end of the six weeks of track workouts.

**In this study about whether doing a track work out affects speed, is a between-subjects design or a within-subjects design used?**

## Question 4

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- **Within-subjects design**
  - You are measuring speed on the 400m dash at two times (*before* any track workouts and *after* the track workouts) for the same people.
  - The same people are in both the *before* group and the *after* group.

## Question 4 - answer

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90 secs

60 secs

30 secs

15 secs

5 secs

It is almost Spring and the flowers are starting to bloom! A bunch of homeowners count the number of flowers that have bloomed on their trees. Suppose the # of flowers on different people's trees are:

60 99 30 50 17 10 85 3

**Calculate the *median* # of flowers for this sample of homeowners.** Make sure to include the units in your answer.

## Question 5

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- **40 flowers**

- There are  $n = 8$  scores.
- The middle score is  $(8+1)/2 = 4.5$ , so find the average of the 4<sup>th</sup> and 5<sup>th</sup> scores, once the scores are ordered.
- Ordered scores: 3 10 17 30 50 60 85 99
- The average of 30 and 50 is 40.

## Question 5 - answer

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90 secs

60 secs

30 secs

15 secs

5 secs

If your sample size is 12, your mean is 16, and your sum of squares (SS) is 99, what is your standard deviation?

## Question 6

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- $s = 3$ 
  - From the SS (given), first calculate the variance,  $s^2$ 
    - $s^2 = SS/(n-1) = 99/(12-1) = 99/11$
    - $s^2 = 9$
  - Then take the square root of the variance to calculate the standard deviation,  $s$ 
    - $s = \sqrt{s^2} = \sqrt{9} = 3$

## Question 6 - answer

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# Round 2

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2 mins

90 secs

60 secs

30 secs

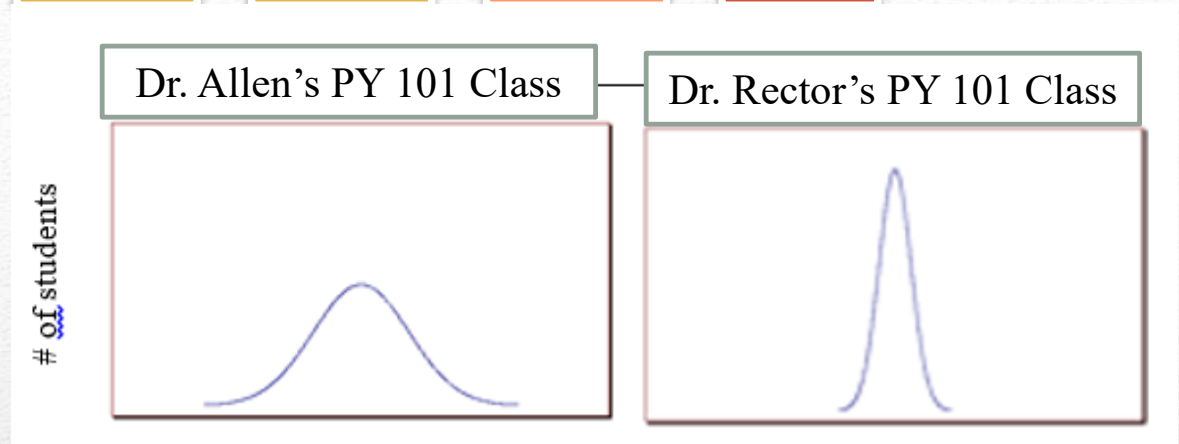
15 secs

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These histograms are for two different classes' midterm exam scores.

Which is **FALSE**?

- a) The variability in scores is lower for Dr. Rector's class (than Dr. Allen's).
- b) The standard deviation is greater for Dr. Allen's classes' midterm exam scores than for Dr. Rector's classes' midterm scores.
- c) The mode, median, and mean are likely to be equal to each other in Dr. Allen's class, and equal to each other in Dr. Rector's class.
- d) None of these are False. (All statements here are true.)



## Question 7

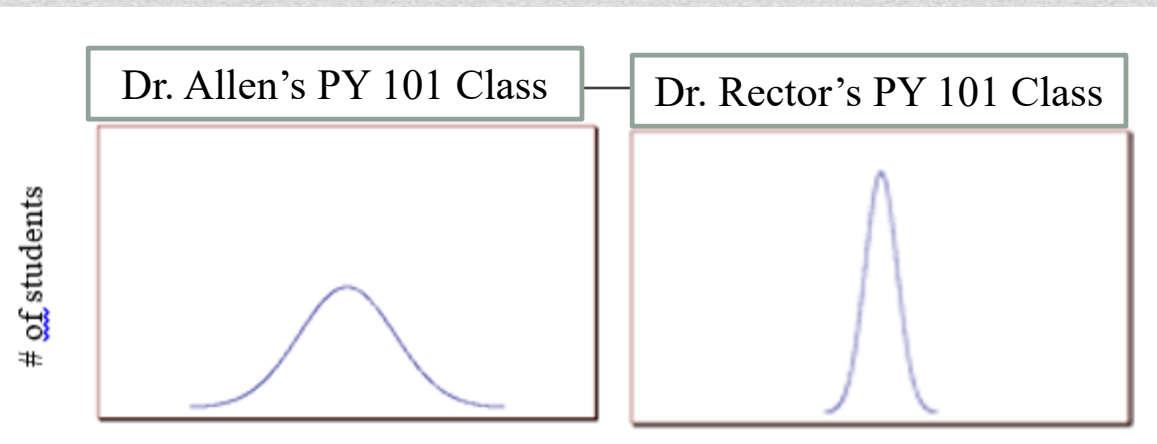
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## D – None are false

Given that the curve for Rector's class is tall and narrow, we know his midterm scores have a *smaller* standard deviation than Dr. Allen's midterm scores, which also means the *variability* in Dr. Rector's class scores is *lower* than in Dr. Allen's.

Both Dr. Allen's and Rector's distributions are symmetrical around the center, meaning that for both classes, the mean will be equal to the median, which will be equal to the mode. (These values may not be identical *across* Allen's and Rector's classes, but within a class, the mean, median and mode will be equivalent.)

# Question





2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

How do you interpret what's meant by a z-score of -0.75?

- a) The typical distance between the sample mean and individual participants' scores, is 0.75 units.
- b) The raw score associated with a z of -0.75 is 0.75 standard deviations below the sample mean.
- c) 0.75% of scores are below that person's raw score.
- d) The raw score associated with a z of -0.75 is 0.75 standard deviations from the lowest score in the distribution.

## Question 8

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The question asked: How do you interpret what's meant by a z-score of -0.75?

- A z-score is defined as: *the number of standard deviations, above or below the mean, a given raw score is.*

For a raw score with a z-score of **-0.75**, this means...

**B) The raw score associated with a z-score of -0.75 is **0.75** standard deviations **below** the sample mean.**

## Question 8 - answer

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

Below is a variance table with some values missing. (All the missing values can be calculated given the information you have, although you do not have to calculate *all* the values to answer this question.) What is the standard deviation in this data set?

- a) 18.80
- b) 4.70
- c) 2.17
- d) 0.97

<u>score</u>	<u>mean</u>	<u>deviation</u>	<u>deviation<sup>2</sup></u>
14			10.24
17	17.2	-0.2	
17		-0.2	0.04
18		0.8	
	17.2	2.8	7.84

## Question 9

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C) 2.17

<u>score</u>	<u>mean</u>	<u>deviation</u>	<u>deviation<sup>2</sup></u>
14			10.24
17	17.2	-0.2	<b>0.04</b>
17		-0.2	0.04
18		0.8	<b>0.64</b>
	17.2	2.8	7.84

# Question 9 - answer

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

- One important aspect of a true experiment is *measurement of a DV*.
- **What are the other three steps you need to take to run a true experiment?**
- You must get all three steps correct to earn credit.
- Please write in full sentences.

## Question 10

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- **Manipulate an IV** (i.e., do not measure both of your variables, *manipulate* at least one)
- **Randomly assign conditions of your IV to participants.**
- **Standardize your procedures across conditions of the IV.**

## Question 10 - answer

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

In a sample of 100 college students, the typical distance between individual students' scores (ages) and the mean age of all the scores ( $\bar{x} = 20.9$ ) is 0.87.

**What's the name of the descriptive statistic that is represented by the value of 0.87?**

## Question 11

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- **The standard deviation**
- The standard deviation is defined as *the typical (standard) distance between the sample mean and individual scores in that sample.*

*Original question:*

In a sample of 100 college students, the typical distance between individual students' scores (ages) and the mean age of all the scores ( $\bar{x} = 20.9$ ) is 0.87.

## Question 11 - answer

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

- Fred's z-score is 1.50. The sample mean, median, and mode are all 10. The variance is 16.
- Calculate Fred's *raw score*.

## Question 12

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- GIVEN: Fred's z-score is 1.50. The sample mean, median, and mode are all 10. The variance is 16.
- To find the raw score associated with a z-score of 1.50, use the z-score formula and solve for  $x_{\text{Fred}}$ .

$$z = (x_{\text{Fred}} - \bar{x}) / s$$

- You first need to find  $s$ . To calculate  $s$ , the standard deviation, take the square root of the variance.  $s = 4$
- $z = (x_{\text{Fred}} - \bar{x}) / s \rightarrow 1.50 = (x_{\text{Fred}} - 10) / 4$ .
- *Solve for  $x_{\text{Fred}}$  to calculate Fred's raw score.*
- $(1.50 * 4) = x_{\text{Fred}} - 10 \rightarrow 6 = x_{\text{Fred}} - 10 \rightarrow 16 = x_{\text{Fred}}$

**ANSWER: 16**

## Question 12 - answer

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# Round 3

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

- Jorge works at a company based in downtown Atlanta and he asks all his coworkers to record how long it takes them to commute to work on a typical Monday. His own commute takes 55 minutes, the average employee's commute takes 47 minutes, and the standard deviation in his sample is 9.8 minutes. He wants to know what proportion of his coworkers have a longer commute time than he does.
- **What is the very first value Jorge would need to calculate, in order to begin to answer this question?**

(The answer to this question is not a number, it is a concept, i.e., you don't actually need to do the calculation, just tell me what you would calculate first.)

## Question 13

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- You'd first need to calculate **the z-score** associated with Jorge's raw score of 55.

## Question 13 - answer

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

- Same scenario: Jorge works at a company based in downtown Atlanta and he asks all his coworkers to record how long it takes them to commute to work on a typical Monday. His own commute takes 55 minutes, the average employee's commute takes 47 minutes, and the standard deviation in his sample is 9.8 minutes. He wants to know what proportion of his coworkers have a longer commute time than he does.
- Now, go through all the steps in order to answer the question, *what proportion of Jorge's coworkers have a longer commute time than him?* Answer with a percentage, rounded to two decimal places.

## Question 14

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- **20.61% of his coworkers have a longer commute**
- $z = (x - \bar{x}) / s \rightarrow$
- $z = (55 - 47) / 9.8 = .8163 \sim +0.82$
- *Then*, convert the z-score into a percentage using the table. A z-score of +0.82  $\rightarrow$  .7939 (79.39%)
- *Then*, subtract that percentage from 100% in order to find the proportion of employees whose commutes are *longer* than his.
- $100\% - 79.39\% = 20.61\%$

## Question 14 - answer

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

A psychology professor wants to know whether taking exams in different ways leads to different scores. Each student chooses whether they take the midterm exam on paper in the classroom, online in the computer lab, or online @ home, and the professor records both their choice and their exam score.

**What kind of study design does the study contain?**

**How many key variables are there?**

**What are the key variables?**

# Question 15

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3-Point Question – partial credit awarded



The design is **correlational**.

There are **two** key variables:

- **students' choice of how they take the exam**
- **exam grades**

Because the study design contains two measured variables and no manipulated variables, the design is *correlational*.

## **Question 15 - answer**

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

- Phoebe wanted to know whether the number of pieces of cookie dough in cookie dough ice cream would influence people's attitudes toward the ice cream. She whipped up four pints of her ice cream – one with only 4 pieces of cookie dough in the ice cream, one with 7 pieces, one with 10 pieces, and one with 15 pieces.
- She had each participant eat 2 ounces from their assigned ice cream pint. Then she measured attitudes by asking “To what extent did you like the ice cream you just ate?” and using a scale from 1-*did not like at all* to 7- *liked it an extreme amount*.

**Identify the independent and dependent variables, and label each as qualitative or quantitative.**

## Question 16

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2-Point Question – partial credit awarded



- Independent: **Number of pieces of cookie dough in the pint** (levels: 4, 7, 10, 15)
  - Qualitative
- Dependent: **Attitude toward the ice cream**
  - Quantitative

## **Question 16 - answer**

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

2-Point Question – partial credit awarded!

A developmental psychologist records whether each participant in a sample of college students is: an only child, first born, middle child, or last born. They conclude from their data that most students in the sample are first born.

**Is the measured variable quantitative or qualitative?**

**Which descriptive statistic did the psychologist calculate/determine from their data, in order to draw the conclusion they drew?**

# Question 17

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- It's a **qualitative** variable
  - The possible response options (an only child, first born, middle child, or last born) are *categories*. Not all the categories can be sensibly ordered, and they are not associated with any numbers/values.
- **The mode**
  - The mode examines which response/value/category appears most frequently in the data set. If the psychologist learns that *most students in the sample are first born*, this means that the psychologist determined the mode of the sample, and the mode is “first born.”

## Question 17 - answer

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

You measure yearly income in a sample of 50 people drawn from the population of Alabama adults. These data are *not* normally distributed. You calculate two different values using your sample data.

The first value is \$3500. The conceptual meaning of this value is that the typical distance between participants' incomes and the mean income in this sample is \$3500.

The second value is \$40,000. The conceptual meaning of this value is that it's the value that cuts off the top 50% of scores from the bottom 50% of scores.

- **What two values (i.e., which descriptive statistics) are represented by \$3500 and \$40,000?**

## Question 18

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2-Point Question - partial credit awarded!



- GIVEN: The first value is \$3500. The conceptual meaning of this value is that the typical distance between participants' incomes and the mean income in this sample is \$3500.
- \$3500 is the **Standard Deviation**
  - Remember that the standard deviation in a sample provides a measure of the *standard* (*typical, average*) distance of our scores from the mean score of our sample.

## Question 18 - answer

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GIVEN: The second value is \$40,000. The conceptual meaning of this value is that it's the value that cuts off the top 50% of scores from the bottom 50% of scores.

- **Median**

- The median is also known as the midpoint of your scores, and midpoint means that half the scores are above it and half are below it.

## Question 18 - answer

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2 mins

90 secs

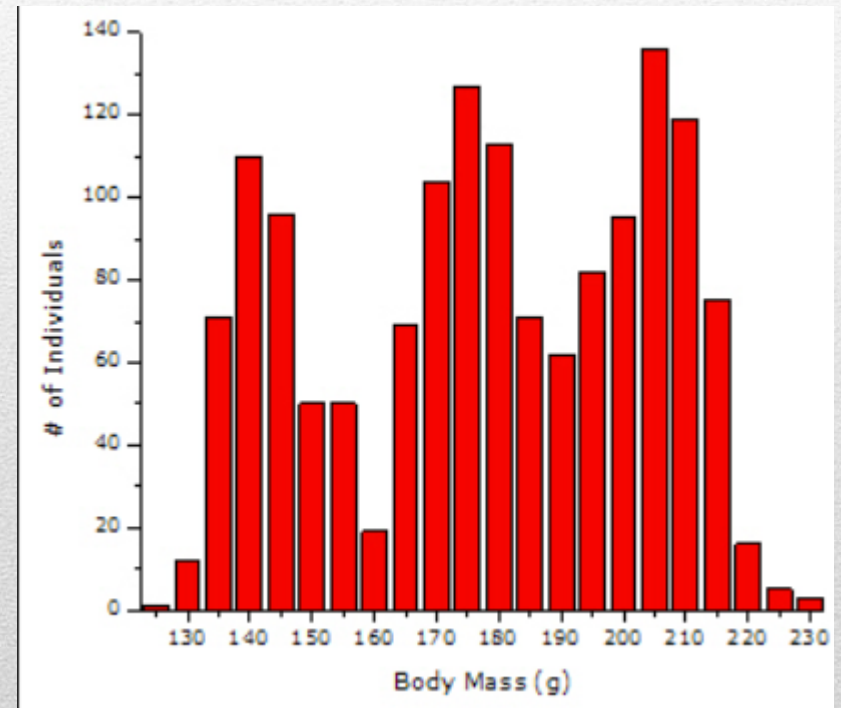
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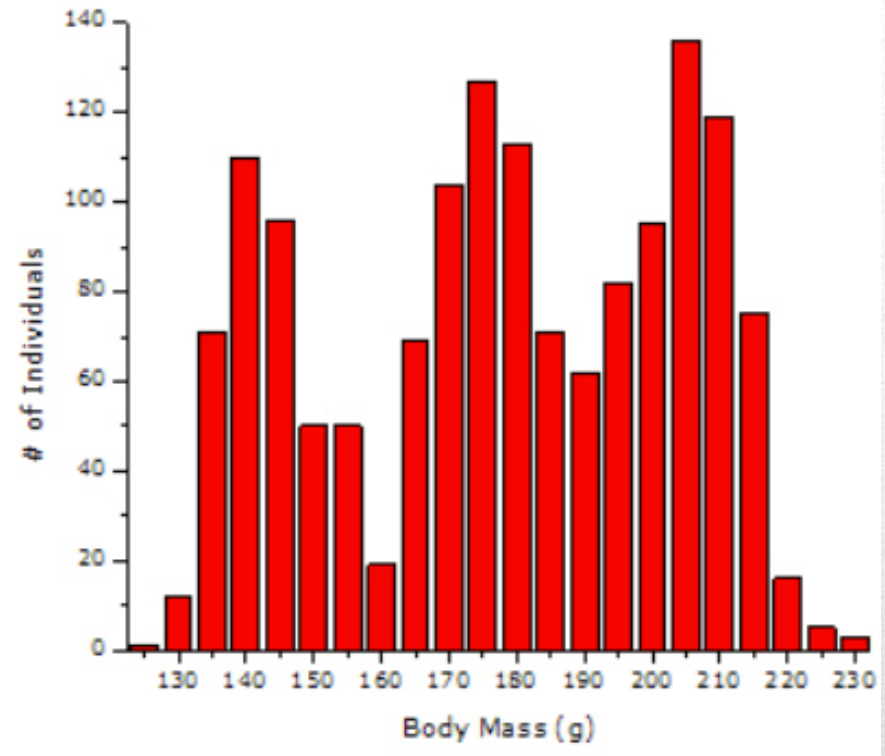
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This distribution would be best described as . . .



# Question 19

- Researchers would call such a distribution *multimodal*.
- While the three peaks do not have identical heights (i.e., a slightly different number of participants have each of the three scores), *multimodal* is still a fitting term for a distribution that looks like this.



## Question 19 - answer

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**Tiebreaker!**

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2 mins

90 secs

60 secs

30 secs

15 secs

5 secs

$\mu$  is the symbol we use to represent the *population* mean.

**x-bar** is what we use to represent the *sample* mean. X-bar is an example of a sample statistic. Another name for a sample statistic is a \_\_\_\_\_.

# Tiebreaker Question

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## Parameter estimate

(A parameter is a statistic measured with population data. When you calculate a statistic with sample data, it is intended to *estimate* the true value of the *parameter*, so we can call it a *parameter estimate*.)

## Tiebreaker Question - answer

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