

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Aim:** How can we use \_\_\_\_\_ averages to manipulate our interpretation of data?

**Warm-up:**

1. Based on the given data, which state has a higher percentage of people who like pineapple pizza?

	New York	California
People who like pineapple pizza	80/138	42/80

## Pizzeria Competition Part 1

	1. Jose Kneaded Pizza	2. Sellis & Moore Pizza	3. Jess Ashley's Pizza	4. Ant-Yan's Fusion Pizza	5. Evina and Pei's Pies
Pepperoni	68/81	28/32	42/49	51/60	73/87
Pineapple	15/22	88/119	72/98	42/59	10/15

Ranking of the Pizzerias:

- 1.
- 2.
- 3.
- 4.
- 5.

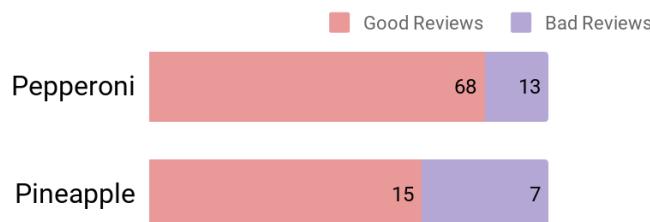
## Pizzeria Competition Part 2

Yelp wants the TOTAL average of positive ratings for each store. How do we find that?

1. Jose Kneaded Pizza	
Pepperoni	$68/81 \approx .836$
Pineapple	$15/22 \approx .682$
Total Avg. of Positive Reviews	

What is the average of total positive reviews for Jose Kneaded Pizza? Show your work.

### Reviews for Jose Kneaded Pizza



### ... Pause for Mini-Lesson ...

\_\_\_\_\_ Average (or \_\_\_\_\_ Mean)

A kind of \_\_\_\_\_ where some data points contribute more “\_\_\_\_\_” than others.

*How do we calculate it generally?*

\_\_\_\_\_ Mean =

*When is it used?*

- When we consider some data points more \_\_\_\_\_ than others
- When each data points has a \_\_\_\_\_ associated with it
- When we want to \_\_\_\_\_ averages or rates

## Simple Average vs. \_\_\_\_\_ Average

Simple Average	_____ Average
<ul style="list-style-type: none"> <li>Formula:</li> <li>Values are _____ weighted</li> <li>_____ _____, median, and mode are types of central tendency</li> </ul>	<ul style="list-style-type: none"> <li>Formula:</li> <li>Each value has a _____ weight</li> <li>_____ a type of central tendency</li> </ul>

## ... Back To Pizzeria Competition Part 2 ...

### What do you predict? (Check the box you predict)

After calculating the weighted averages, will the Pizza Pyramid Ranking:

- Change a lot?
- Change a little?
- Stay the same?

*Let's Find Out!*

	1. Jose Kneaded Pizza	2. Sellis & Moore Pizza	3. Jess Ashley's Pizza	4. Ant-Yan's Fusion Pizza	5. Evina and Pei's Pies
Pepperoni	68/81	28/32	42/49	51/60	73/87
Pineapple	15/22	88/119	72/98	42/59	10/15
Average of Positive Reviews					

NEW Ranking of the Pizzerias:

- 1.
- 2.
- 3.
- 4.
- 5.

What do you notice about the old and new rankings? Why do you think that happened?

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### **Paradox**

A paradox that occurs when trends that appear in subgroups are \_\_\_\_\_ when the data are \_\_\_\_\_, or combined.

### **Conclusion: Who won?**

Congratulations \_\_\_\_\_!

### **Challenge Problems**

Use your knowledge about the weighted average and Simpson's Paradox.

1. Is this statement true or false? Why?

Given  $\frac{a}{b} > \frac{e}{f}$  and  $\frac{c}{d} > \frac{g}{h}$ , then  $\frac{a+c}{b+d} > \frac{e+g}{f+h}$ .

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Hint: Did we use fraction addition to calculate the weighted average?

2. Based on your answer, explain why the results in Competition Part 1 differ from the results in Part 2.

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