U4D1 filled_Statistical Measures

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U4D1 filled_Stat...

MAP 4CI **Unit 4 Lesson 1: Statistical Measures**

Recall:
One variable data has only one list of data.
It can be analysed using: mean, median, or mode.

Statistical Language

Net Income per capita = Total Income of everyone ÷ Total number of people

Per capita means the average per person or the number of items divided by the number of people.

Net worth is the total assets (wealth) minus total liabilities(debt)

NET WORTH=ASSETS –LIABILITIES

Examples of Assets: home, car, land, furniture, appliances, clothing, investments (anything that could be sold and converted to cash)

Examples of Liabilities: mortgage, property taxes, bills, insurance, car loan, credit card debt

Percent change measures a change in value over time

$$\text{Percent Increase/Decrease} = \frac{New\ Value - Old\ Value}{Old\ Value} \times 100\%$$

If answer is positive it is a percent increase,
If answer is negative, it is a percent decrease.

Percentile is a number between 1 and 99 indicating the percent of the population with a score less than or equal to a specific value. Percentiles are a good way to rank data when you have a lot of data or you want to keep data private.

Percentile Rank is the percent of the population with a score less than a specific score.

Use formula $p = \left(\frac{L + 0.5E}{n}\right) \times 100$ where p = percentile rank

L = number of scores less than the value
E = number of scores equal to the value
n = total number of scores

Example 1

The table shows the heights of 15 people in a class, ranked from tallest to shortest.

Height (cm)	Rank
182	1
180	2
179	3
178	4
176	5
175	6
172	7
170	8
168	9
167	10
165	11
164	12
163	13
160	14
157	15

a) Calculate the percentile rank for a person with a height of 176 cm.

L = 10 E = 1 n = 15

$$p = \left(\frac{10 + 0.5(1)}{15}\right) \times 100$$

$$p = \left(\frac{10.5}{15}\right) \times 100$$

$p = 70$

∴ *the person who is 176 cm tall has a* ***percentile rank of 70***.

That means that he/she is in the **70th percentile.**

Seventy percent of the people are shorter than that person.

b) Which score/height is in the 25th percentile?

p = 25 n = 15

$$\frac{n \times p}{100} = \frac{15 \times 25}{100}$$

$= 3.75$

Round **up** to next whole number. Round up to 4. (Even 3.1 would be rounded up to 4)

Find the fourth lowest score.

∴ **164 cm is in the 25th percentile.**

Quartile is any of 3 numbers that separate a sorted data set into four equal parts.

- The second quartile Q_2 is the median. It cuts the data in half. = 50th percentile
- The first quartile or lowest quartile Q_1 is the middle of the lower half of the data. It separates the lowest 25%. = 25th percentile
- The third quartile is the middle of the upper half of the data. It separates the highest 25%. = 75th percentile.

Q_1 Q_2 Q_3

Example 2

Here are the hourly pay rates in dollars for 17 high school students.

11.5	10.2	8	8.25	9	9.15
9.75	7.5	8	12.5	13	11.25
10.75	9.5	9.25	9.45	7.75	

a) What are the quartiles for this data set?

13
12.5
11.5
11.25
10.75
10.2
9.75
9.5
9.45
9.25
9.15
9
8.25
8
8
7.75
7.5

→ For third quartile, (11.25+10.75)/2 = 11 $11/hr

← Second Quartile = Median = $9.45/hr

→ For First Quartile, (8+8.25)/2 = 8.125 or about $8.13/hr

b) Dave's pay is in the 85th percentile for this group. What does the percentile mean? What is Dave's hourly pay rate?

85% of the students are paid a lower hourly rate than Dave.

$n \times p \div 100$

$= 17 \times 85 \div 100$

$= 14.45$ Select the 15th lowest piece of data.

Therefore, Dave is making $11.50/hr if he is in the 85th percentile.

Practice: Pg 205-211 # 1ace, 2ace, 3, 5, 7, 10, 11 ac (✓ Answers Pg 549)