Activity 3.5 Applied Statistics

Name:_____

1. Part of the manufacturing quality control testing for a toy is to measure the depth of a connector piece that must fit into another part. The designed depth is 4.1 cm. Every tenth part produced on the production line is measured. The following data was collected during a two-minute production period:

4.1, 4.1, 4.0, 4.1, 3.9, 4.4, 3.9, 4.3, 4.0, 4.2, 4.0, 3.8

a. Place the values in order from least to greatest

b. Find the following.

i. Sum of the data collected: $\sum$ = _____

ii. Number of terms: n = _____

c. Calculate each of the following measures of central tendency. Show your work.

i. Mean:_____

ii. Median:_____

iii. Mode:_____

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d. Calculate each of the following measures of variation for the data set. Show your work in your notebook. Create a table similar to the one shown in your PLTW Engineering Notebook to help you calculate the (population) standard deviation. In the table, round values in the last two columns to four decimal places. Report the standard deviation statistics to four decimal places.

i. Range:_____

ii. Use the table below to organize your work when ultimately finding standard deviation.

x	x - μ	$(x - \mu)^2$

iii. $\sum(x - \mu)^2$ = _____

iv. Standard Deviation of the data: _____

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b. Create a histogram for the data. The horizontal axis should display each length measurement from the minimum to maximum recorded lengths. You may choose to begin with a dot plot and then fill in the bars. Be sure to label your axes.

c. What class interval is appropriate for the measurement values reported as 4.1 cm?

_____ < x ≤ _____

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Age of Avengers during Infinity War

Vision - 3
Groot - 4
Spider-Man - 18
Gamora - 29
Scarlet Witch - 29
Nebula - 30
Mantis - 32
Black Widow - 34

Nick Fury - 67
War Machine - 50
Hulk - 49 (or 13)
Ant-Man 49
Drax - 49
Iron Man - 48
Hawkeye - 47
Black Panther 42

Falcon - 40
Star-Lord - 38
Captain America - 100
The Winter Soldier - 101
Thor - ∞
Loki - ∞

2. **Using the data provided above, repeat the steps from number 1 to get a statistical analysis of the ages of the Avengers during Infinity War.**

$\sum$ = _____
n = _____
Mean = _____

Median = _____
Mode = _____
Range = _____

Standard Deviation = _____

x	x - μ	$(x - \mu)^2$

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CONCLUSION

1. How can statistics of a product's dimensions be used to assess the quality of the product?

2. In which phase(s) of a design process might statistics be most useful? Why?

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