

Answers/Rubric Thingy for the stats worksheet -cn

Hopefully my math is correct, I would check everything again

How to Find the Mean

The mean is just the ___average_____ of the numbers.

It is easy to calculate: Just add up all the numbers, then divide by how many numbers there are. (In other words it is the sum divided by the count)

Example 1: What is the Mean of these numbers?

3, 7, 5, 13, 20, 23, 39, 23, 40, 23, 14, 12, 56, 23, 29

The sum of these numbers is equal to 330 and there are 15 numbers.

The mean of the above numbers is 22.

How to find the Median Value

It's the _____middle_____ number in a sorted list.

To find the Median, place the numbers you are given in _____order_____ and find the _____middle_____.

Look at these numbers:

3, 13, 7, 5, 21, 23, 39, 23, 40, 23, 14, 12, 56, 23, 29

If we put those numbers in order we have:

3, 5, 7, 12, 13, 14, 21, 23, 23, 23, 23, 29, 39, 40, 56

There are 15 numbers. Our middle number will be 23.

BUT, if there are an **even** amount of numbers things are slightly different.

In that case we need to find the middle pair of numbers, and then find the value that would be half way between them. This is easily done by adding them together and dividing by _____.

Example: Put the following numbers in order.

3, 13, 7, 5, 21, 23, 23, 40, 23, 14, 12, 56, 23, 29

3, 5, 7, 12, 13, 14, 21, 23, 23, 23, 23, 29, 40, 56

There are now fourteen numbers and so we don't have just one middle number, we have a pair of middle numbers:

___21___ and ___23___

To find the value half-way between them, add them together and divide by 2:

And, so, the Median in this example is ___22___.

How to Find the Mode or Modal Value

The mode is simply the number which appears ___most often_____.

To find the mode or modal value requires you to put the numbers you are given into a table.

Find the mode of these numbers:

3, 7, 5, 13, 20, 23, 39, 23, 40, 23, 14, 12, 56, 23, 29

number	count
3 (1)	56 (1)
7 (1)	29 (1)
5 (1)	
13 (1)	
20 (1)	
23 (4)	
39 (1)	
40 (1)	
14 (1)	
12 (1)	

Accuracy & Precision

Accuracy is how close a measured value is to the ___real_____ value.

Precision is how close the measured values are to ___each other_____.

Examples of Precision and Accuracy:



Low Accuracy
High Precision

High Accuracy
Low Precision

High Accuracy
High Precision

So, if you are playing soccer and you always hit the left goal post instead of scoring, then you are not ___accurate_____, but you are ___precise_____!

Standard Deviation & Variance

The Standard Deviation (σ) is a measure of how ___spread out_____ numbers are.

The formula is easy: it is the square root of the Variance. So now you ask, "What is the Variance?"

The Variance (which is the square of the standard deviation, ie: σ^2 , is defined as:

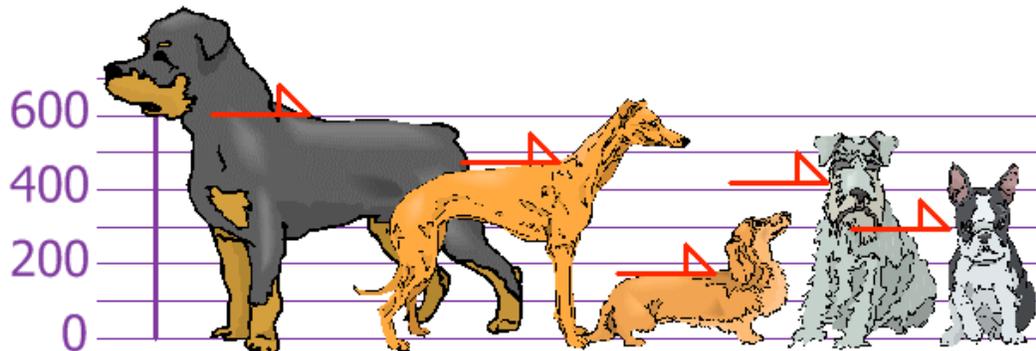
The average of the squared differences from the Mean.

In other words, follow these steps:

1. Calculate the Mean
2. Now, for each number subtract the Mean and then square the result (the squared difference).
3. Find the average of those squared differences. (Why Square?)

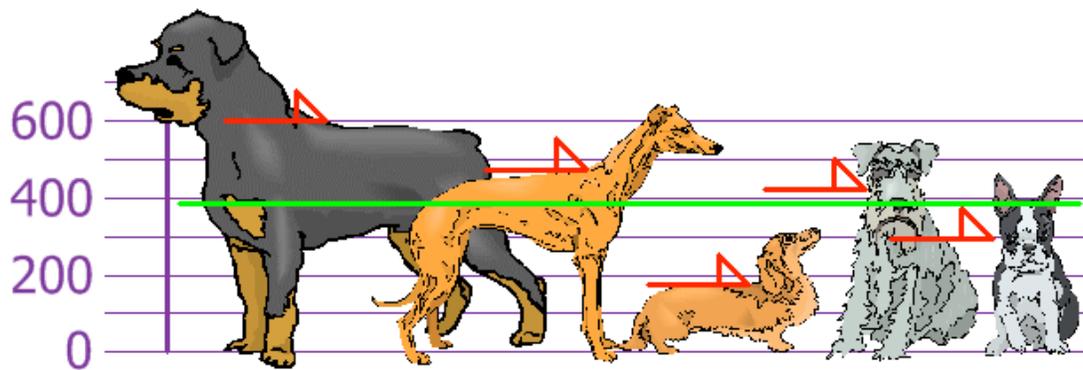
Example

You and your friends have just measured the heights of your dogs (in millimeters):

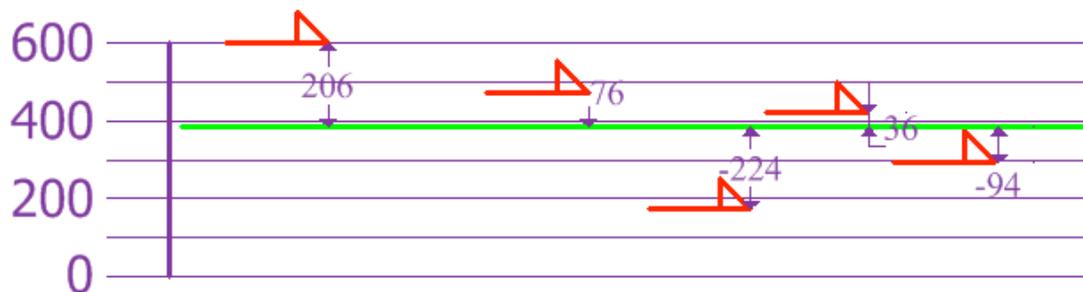


The heights (at the shoulders) are: 600mm, 470mm, 170mm, 430mm and 300mm.

Mean = 394



Now, we calculate each dog's difference from the Mean:



To calculate the Variance, take each difference, square it, and then average the result:

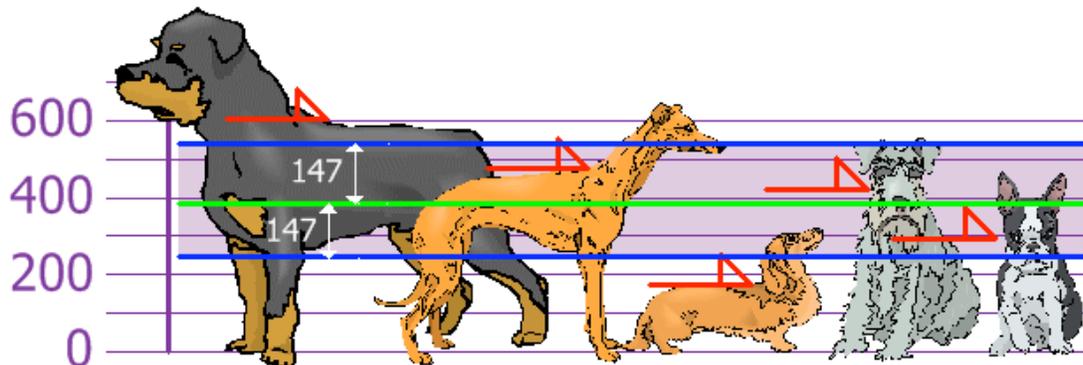
$$\text{Variance: } \sigma^2 = (42436 + 5776 + 50176 + 1296 + 8836)/5 = 21704$$

So, the Variance is 21704.

And the Standard Deviation is just the square root of Variance, so:

$$\text{Standard Deviation: } \sigma = \sqrt{21704} = 147.32$$

And the good thing about the Standard Deviation is that it is useful. Now we can show which heights are within one Standard Deviation of the Mean:



So, using the Standard Deviation we have a "standard" way of knowing what is normal, and what is extra large or extra small.

Circle which dogs are **extra** tall and **extra** short.

*Note: Why square?

Squaring each difference makes them all positive numbers (to avoid negatives reducing the Variance). But squaring them makes the final answer really big, and so un-squaring the Variance (by taking the square root) makes the Standard Deviation a much more useful number.

Find the mean, median, variance and standard deviation of this set of data:

37, 56, 78, 54, 108, 22, 60, 10

Mean: 53.13 Median: 55

Variance, σ^2 846.86 SD, σ : 31.11