

Pit and Pendulum Standard Deviation After Day 12

1. Find the standard deviation for the set of numbers given below. Work carefully. You may use your calculator to do calculations. Data: 37, 43, 36, 40, 39

Data	Difference	(Difference) ²
Sum		
Mean of Sum		

The standard deviation is _____. Now sketch a normal curve and put in the correct values for the mean and one and two standard deviations from the mean.

2. Now, using your graphing calculator, let your calculator compute the standard deviation for this same set of data. Record the value given for σ : _____

Quiz THE PIT AND THE PENDULUM

Five students were chosen randomly from the two IMP 1 classes. Their averages are shown below. For each class find the mean and the standard deviation accurate to 2 decimal places. **You must show your work for credit.** You may use a scientific calculator, but not a graphing calculator, to find square root or to check your math. Then fill in the five numbers indicated on the normal curve shown.

Period 2: 78, 76, 64, 81, 70

Mean: _____ σ : _____

Period 5: 87, 76, 74, 81, 77

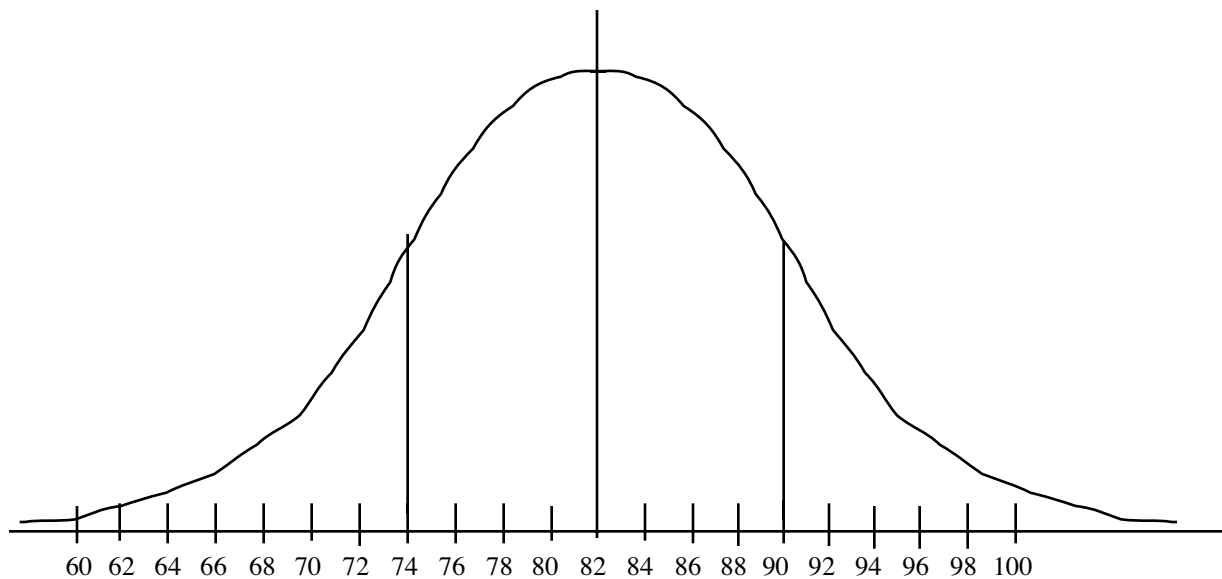
Mean: _____ σ : _____

1. For which class are the grades most spread out? To receive credit, you must correctly explain how you know. _____

2. In which class would a grade of 72 be a “normal” grade? _____
3. What value(s) would signify a “usual” grade for period 2? (Note: all grades are whole numbers.) _____
4. For period 5, what would be the lowest whole number grade that would be “normal” ? _____

PIT AND THE PENDULUM After DAY 14

1. The mode, the median, and the _____ are called the measures of center. We have been studying the measures of _____ in this unit. To compare the spread of different data sets we calculate the _____. The lower case Greek letter, _____, is used to represent this statistic. Statisticians usually consider data significant if it is within _____ of the mean. One standard deviation from the mean contains _____% of the data if the data follows a _____ curve. The % of data considered very rare is _____%.



2. The normal curve above represents students' grades on a math test. The mean and **first standard deviation lines** have been drawn in.
- Very carefully and accurately, draw in the second deviation lines in their appropriate places on the curve.
 - What percent of the class scored better than 90? _____
 - What percent of the class scored below 82? _____
 - What percent of the class scored between 66 and 90? _____

Normal Distribution & Standard Deviation – Quiz page 2

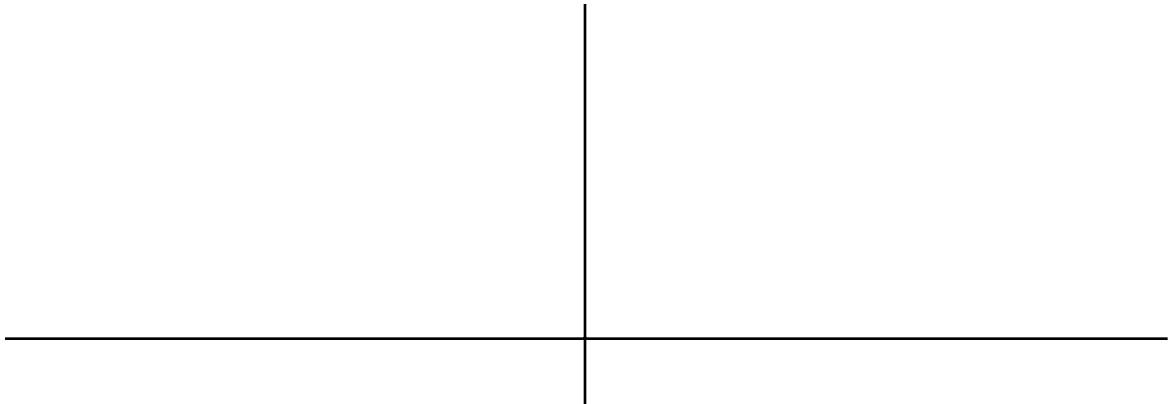
3. A budding guitarist keeps track of the number of minutes practiced each day last week: $x_1 = 30$ $x_2 = 2$ $x_3 = 68$ $x_4 = 30$ $x_5 = 90$ $x_6 = 210$ $x_7 = 45$

a) What is the range of minutes spent practicing? _____

b) To the nearest whole minute, find the mean of minutes practiced each day.

c) Find the standard deviation. _____

d) Sketch a graph of the distribution of the above data.



Pit and Pendulum

Does Amplitude Matter?

You will be investigating the effect of the amplitude on the period of a pendulum. You will do 3 experiments--each experiment with a different angle. Every group will do 30 degrees. All other variables in the experiment will remain the same as with the Standard Pendulum, i.e., 2 feet in length and one washer.

Each experiment will consist of 5 trials. A trial will be the average of 12 complete swings; record the time for the 12 swings inside the parentheses(); record the average on the _____.

For each experiment you are to find the mean and standard deviation of your five averages, which should be recorded on this sheet also.

Experiment #1
Angle: 30 degrees

Trial 1 () _____

Trial 2 () _____

Trial 3 () _____

Trial 4 () _____

Trial 5 () _____

Mean _____

S. D. _____

Experiment #2
Angle: _____

Trial 1 () _____

Trial 2 () _____

Trial 3 () _____

Trial 4 () _____

Trial 5 () _____

Mean _____

S. D. _____

Experiment #3
Angle: _____

Trial 1 () _____

Trial 2 () _____

Trial 3 () _____

Trial 4 () _____

Trial 5 () _____

Mean _____

S. D. _____

Looking at your data, do you think amplitude matters? _____

Members of your group:

Pit and Pendulum

Does Weight Matter?

You will be investigating the effect of the weight of the bob on the period of a pendulum. You will do 3 experiments--each experiment with a different number of washers. Every group will do 5 washers. All other variables in the experiment will remain the same as with the Standard Pendulum, i.e., 2 feet in length and 20 degrees.

Each experiment will consist of 5 trials. A trial will be the average of 12 complete swings; record the time for the 12 swings inside the parentheses(); record the average on the _____.

For each experiment you are to find the mean and standard deviation of your five averages, which should be recorded on this sheet also.

Experiment #1 # of washers: 5	Experiment #2 # of washers: _____	Experiment #3 # of washers: _____
Trial 1 () _____	Trial 1 () _____	Trial 1 () _____
Trial 2 () _____	Trial 2 () _____	Trial 2 () _____
Trial 3 () _____	Trial 3 () _____	Trial 3 () _____
Trial 4 () _____	Trial 4 () _____	Trial 4 () _____
Trial 5 () _____	Trial 5 () _____	Trial 5 () _____
Mean _____	Mean _____	Mean _____
S. D. _____	S. D. _____	S. D. _____

Looking at your data, do you think weight of the bob matters? _____

Members of your group:

Pit and Pendulum

Does Length Matter?

You will be investigating the effect of length on the period of a pendulum. You will do 3 experiments--each experiment with a different length. Every group will do 4 feet. All other variables in the experiment will remain the same as with the Standard Pendulum, i.e., one washer and 20 degrees.

Each experiment will consist of 5 trials. A trial will be the average of 12 complete swings; record the time for the 12 swings inside the parentheses(); record the average on the _____.

For each experiment you are to find the mean and standard deviation of your five averages, which should be recorded on this sheet also.

Experiment #1
Length: 4 feet

Trial 1 () _____

Trial 2 () _____

Trial 3 () _____

Trial 4 () _____

Trial 5 () _____

Mean _____

S. D. _____

Experiment #2
Length: _____

Trial 1 () _____

Trial 2 () _____

Trial 3 () _____

Trial 4 () _____

Trial 5 () _____

Mean _____

S. D. _____

Experiment #3
Length: _____

Trial 1 () _____

Trial 2 () _____

Trial 3 () _____

Trial 4 () _____

Trial 5 () _____

Mean _____

S. D. _____

Looking at your data, do you think length matters? _____

Members of your group:

QUIZ Data vs Family of Curves

For each set of data, determine if the graph seems to be a parabola, radical, line, or none of these.

1.

IN	OUT
4	27
5	22
7	12
3	32
6	17

2.

IN	OUT
2	3
5	19
8	17
3	9
6	29

3.

IN	OUT
1	4
4	76
5	140
3	36
2	14

4.

IN	OUT
0	1
4	9
8	17
3	7
9	19

5.

IN	OUT
4	51
5	70
8	187
3	22
2	7

6.

IN	OUT
11	2
16	3
8	1
32	5
23	4

7.

IN	OUT
11	5
39	9
23	7
59	11
3	3

8.

IN	OUT
0	3
5	28
8	67
3	12
6	39

IN-CLASS Assessment for THE PIT AND THE PENDULUM

I.

Steve works in a hobby shop. He was looking at the relationship between the length of certain models and the amount of paint they require.

Here are some estimates he came up with:

Length of Model (in feet)	Amount of Paint (in ounces)
1	2
2	6
3	14
5	40

- a) Construct a graph using this data.
- b) Find the curve of best fit.
- c) Assuming that this pattern continue, estimate how much paint would be needed for a model that is 10 feet long.
- d) Explain your reasoning.

II. An IMP 4 class was doing a research project and collected data on their heights as follows: 59, 59.5, 60, 61, 61.5, 62, 63, 64, 65, 65, 65, 66, 69, 70, 70, 71. Since it has been a while since they have used the Standard Distribution Curve, they have requested your help to:

- a) On the back, **Show them** how to calculate, to the nearest tenth, the Mean and Standard Deviation for this data.
Mean = _____ Standard Deviation = _____
- b) What would be the largest and the smallest heights that would still be within the “Normal Range”? Largest = _____ Smallest = _____
- c) Sketch a graph of the this distribution data on the back , showing the mean, and $\pm 2\sigma$.