# Centers and Variation Classwork

1. A data science consultancy pays its workers the following salaries dependent on title:

|  |  |  |
| --- | --- | --- |
| **Title** | **Number of Employees** | **Monthly Salary** |
| CEO | 1 | 0 |
| Senior Data Scientists | 7 | 15,000 |
| Junior Data Scientists | 4 | 8,000 |
| Administration | 2 | 5,000 |
| Sales | 1 | 4,000 |

Compute the average salary.

Answer: 10,066

If the mean of numbers 28, x, 42, 78 and 104 is 62, what is the value of x?

Answer: 58

1. Owing to numerous boiler breakdowns, a new heating system was recently installed at Sorotzkin 16. Several students are now complaining that it is too warm, whereas others are complaining that it is too cold. In an attempt to satisfy everyone (impossible!), the management has decided to install an energy-saving thermostat and to poll each of the students as to what temperature it should be set. The following data was obtained:

|  |  |
| --- | --- |
| mean | 22 |
| median | 21 |
| mode | 20 |

At which temperature should the thermostat be set to satisfy as **many** students as possible?

Answer: 20, this is the most frequent number.

1. Find the range, variance, and standard deviation for 1, 2, 3, 4, 5, 6, 7?

Answer:

* Range: 6
* Variance : 4.66…
* Standard deviation: 2.

1. Find the range, variance, and standard deviation of each brand of tire in the table (from the in-class example) without python.

|  |  |
| --- | --- |
| Brand X | Brand Y |
| 14,000 | 10,000 |
| 12,000 | 8,000 |
| 12,000 | 14,000 |
| 14,000 | 10,000 |
| 14,000 | 8,000 |
| 11,000 | 40,000 |
| 14,000 | 8,000 |

Answer brand x:

* Range: 3000
* Variance : 1,666,666.66
* Standard deviation: 1290.99

Answer brand y:

* Range: 32000
* Variance : 136,000,000
* Standard deviation: 11,661.9

1. For each part, compare distributions (1) and (2) based on their means and standard deviations. You do not need to calculate these statistics; simply state how the means and the standard deviations compare. Make sure to explain your reasoning. Hint: It may be useful to sketch dot plots of the distributions.

(a) (1) 3, 5, 5, 5, 8, 11, 11, 11, 13

(2) 3, 5, 5, 5, 8, 11, 11, 11, 20

(b) (1) -20, 0, 0, 0, 15, 25, 30, 30

(2) -40, 0, 0, 0, 15, 25, 30, 30

(c) (1) 0, 2, 4, 6, 8, 10

(2) 20, 22, 24, 26, 28, 30

Answer:

* 1. Distribution 2 has a higher standard deviation since all digits are the same except for 20 which is further than 13.
  2. Distribution 1 has a higher standard deviation since all digits are the same except for -20 that increases the mean and lowers the standard deviation.
  3. Distribution 2 will have a higher mean since the numbers are higher.

The standard deviation will be the same because they are around the same range.