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**MAT 161 – ASSIGNMENT II**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Weight(g) | 20 - 24 | 1. - 29 | 1. – 34 | 35 - 39 |
| Frequency | 1 | 5 | 3 | 7 |

1. Find the mean, median and mode of the distribution.

Where is the frequency of weights and is the Weights.

|  |  |  |  |
| --- | --- | --- | --- |
| **Weight(g)** | **Midpoint(x)** | **Frequency(f)** | **f(x)** |
| 20 – 24 | 22 | 1 | 22 |
| 25 – 29 | 27 | 5 | 135 |
| 30 – 34 | 32 | 3 | 96 |
| 35 – 39 | 37 | 7 | 295 |
| **Total** |  |  |  |

Substitute values in the Mean Equation

|  |  |  |
| --- | --- | --- |
| **Weight(g)** | **Frequency(f)** | **cf** |
| 20 – 24 | 1 | 1 |
| 25 – 29 | 5 | 6 |
| **30 – 34** | **3** | **9** |
| 35 – 39 | 7 | 16 |

30 - 34 is the median class.

|  |  |
| --- | --- |
| **Weight(g)** | **Frequency(f)** |
| 20 – 24 | 1 |
| 25 – 29 | 5 |
| 30 – 34 | 3 |
| **35 – 39** | **7** |

35 – 39 is the Modal Class

Comment:

* The median will be the most acceptable measure of location for this data since the median isn’t affected by the extreme values in the data.

1. Compute and interpret the variance and Standard Deviation.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Weight(g)** | **Midpoint(x)** | **Frequency(f)** |  |  | **fd** |  | **fd2** |
| 20 – 24 | 22 | 1 | -10 | 10 | -10 | 100 | 100 |
| 25 – 29 | 27 | 5 | -5 | 5 | -25 | 25 | 125 |
| 30 – 34 | 32 | 3 | 0 | 0 | 0 | 0 | 0 |
| 35 – 39 | 37 | 7 | 5 | 5 | 35 | 25 | 175 |
| **Total** |  |  |  |  |  |  |  |

* Variance of and Standard Deviation of indicates that the weights in the data set have a relativity larger spread or variability.
* Weights in the Dataset are relatively diverse and not tightly clustered around the mean

The relative variability or dispersion of the weights in relation to the mean is around



|  |  |  |
| --- | --- | --- |
| **Weight(g)** | **Midpoint(x)** | **Deviation from Mean** |
| 20 – 24 | 22 | 22 – 32 = 10 |
| 25 – 29 | 27 | 27.5 – 32 = -4.5 |
| 30 – 34 | 32 | 32 – 32 = 0 |
| 35 – 39 | 37 | 37.5 – 32 = 5.5 |

* Values from within the weight class are relatively farther away from the mean compared to the other weight classes/groups.

1. For weight class with positive deviation of 5.5.

2.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age | 0-9 | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 |
| Frequency | 10.8 | 9.3 | 7.9 | 7.6 | 6.7 | 6.7 | 6.0 | 3.8 | 1.2 |

Write out the Wolfram Mathematica and the results for determining the Mean Deviation, Variance and Standard Deviation of the above Age Distribution.

**CODE**

(\* Define the age intervals and frequencies \*)

ages = {{0, 9}, {10, 19}, {20, 29}, {30, 39}, {40, 49}, {50, 59}, {60, 69}, {70, 79}, {80, 89}};

frequencies = {10.8, 9.3, 7.9, 7.6, 6.7, 6.7, 6.0, 3.8, 1.2};

(\* Calculating Midpoints, mean of the grouped data and absolute deviation\*)

mid\_points = Mean /@ ages;

mean = Mean[WeightedData[mid\_points, frequencies]];

deviations = Abs[mid\_points - mean];

(\* Multiply each absolute deviation by the corresponding frequency \*)

weighted\_deviations = deviations \* frequencies;

(\* Calculate the sum of the weighted deviations \*)

sum\_weighted\_deviation = Total[weighted\_deviations];

(\* Calculate the total frequency \*)

total\_frequency = Total[frequencies];

(\* Calculate the mean deviation \*)

mean\_deviation = sum\_weighted\_deviation / total\_frequency;

(\* Calculate the squared deviations \*)

squaredDeviations = deviations^2;

(\* Multiply each squared deviation by the corresponding frequency \*)

weightedSquaredDeviations = squaredDeviations \* frequencies;

(\* Calculate the sum of the weighted squared deviations \*)

sumWeightedSquaredDeviations = Total[weightedSquaredDeviations];

(\* Calculate the variance \*)

variance = sumWeightedSquaredDeviations / total\_frequency;

(\* Calculate the standard deviation \*)

standard\_deviation = Sqrt[variance];

(\* Print the mean deviation, standard deviation, and variance \*)

Print["Mean Deviation: ", mean\_deviation]

Print["Standard Deviation: ", standard\_deviation]

Print["Variance: ", variance]

**RESULT**

Mean Deviation: 22.1214

Standard Deviation: 23.6306

Variance: 558.415