LAIKIPIA UNIVERSITY COLLEGE

NYAHURURU CAMPUS

DIBM 0213: BUSINESS STATISTICS

1. What are the characteristics of a data set that would lead you to construct a pie chart? (4 mks)

*•* ***Use Pie Charts***

*– If all the categories sum to a meaningful total*

*– If you want to emphasis the differences in proportions between categories that sum to 100%*

*– For a single snapshot*

*•* ***Avoid Pie Charts***

*– If looking at changes over time would need to have a separate pie chart for each year*

*– If more than 5 categories…*

*– If small proportional difference between the segments…*

1. Distinguish categorical and quantitative variables, giving two real life examples of each. (4 mks)

*Some variables are* ***categorical*** *and others are* ***quantitative.*** *A categorical variable places each individual into a category, such as male or female. A quantitative variable has numerical values that measure some characteristic of each individual, such as height in centimeters or salary in Kenya Shillings. You can perform arithmetic manipulations (add, subtract, divide, multiply, average) on quantitative variables, but you can’t do it on categorical variables.*

1. The Synnovate group asked a random sample of adults whether they had favorable or unfavorable opinions of a number of major companies. Answers to such questions depend a lot on recent news. Here are the percents with favorable opinions for several of the companies:

|  |  |
| --- | --- |
| **COMPANY** | **% in Favor of company** |
| Safaricom | 71 |
| Airtel | 59 |
| Kenya Commercial Bank | 53 |
| Kenya Airways | 44 |
| EABL | 73 |
| East Africa Cables | 25 |
| Kenya Power and Lighting | 71 |
| CMC Motors | 38 |

Make a bar graph to display these data. (The scale may be approximate). (4 mks)

1. Consider the following data:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 71 | 89 | 65 | 97 | 46 | 52 | 99 | 41 | 62 | 88 |
| 73 | 50 | 91 | 71 | 52 | 86 | 92 | 60 | 70 | 91 |
| 73 | 98 | 56 | 80 | 70 | 63 | 55 | 61 | 40 | 95 |

1. Make a stem plot for the data. (4 mks)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **4** | 0 | 1 | 6 |  |  |  |  |
| **5** | 0 | 2 | 2 | 5 | 6 |  |  |
| **6** | 0 | 1 | 2 | 3 | 5 |  |  |
| **7** | 0 | 0 | 1 | 1 | 3 | 3 |  |
| **8** | 0 | 6 | 8 | 9 |  |  |  |
| **9** | 1 | 1 | 2 | 5 | 7 | 8 | 9 |

1. Determine the mean and variance of the data. (6 mks)

|  |  |  |  |
| --- | --- | --- | --- |
|  | X | (X-Mean)∆2 | Z= (X-Mean)/ Standard deviation |
|  | 40 | 975.3129 | -1.728664343 |
|  | 41 | 913.8529 | -1.673311659 |
|  | 46 | 636.5529 | -1.396548235 |
|  | 50 | 450.7129 | -1.175137496 |
|  | 52 | 369.7929 | -1.064432127 |
|  | 52 | 369.7929 | -1.064432127 |
|  | 55 | 263.4129 | -0.898374073 |
|  | 56 | 231.9529 | -0.843021388 |
|  | 60 | 126.1129 | -0.621610649 |
|  | 61 | 104.6529 | -0.566257965 |
|  | 62 | 85.1929 | -0.51090528 |
|  | 63 | 67.7329 | -0.455552595 |
|  | 65 | 38.8129 | -0.344847226 |
|  | 70 | 1.5129 | -0.068083802 |
|  | 70 | 1.5129 | -0.068083802 |
|  | 71 | 0.0529 | -0.012731117 |
|  | 71 | 0.0529 | -0.012731117 |
|  | 73 | 3.1329 | 0.097974252 |
|  | 73 | 3.1329 | 0.097974252 |
|  | 80 | 76.9129 | 0.485443045 |
|  | 86 | 218.1529 | 0.817559153 |
|  | 88 | 281.2329 | 0.928264523 |
|  | 89 | 315.7729 | 0.983617207 |
|  | 91 | 390.8529 | 1.094322577 |
|  | 91 | 390.8529 | 1.094322577 |
|  | 92 | 431.3929 | 1.149675261 |
|  | 95 | 565.0129 | 1.315733315 |
|  | 97 | 664.0929 | 1.426438685 |
|  | 98 | 716.6329 | 1.48179137 |
|  | 99 | 771.1729 | 1.537144054 |
| **Total** | **2137** | **9465.367** |  |
| **n=** | **30** | **Variance=9465/29=** | **326.3793103** |
| **Mean=** | **2137/30** | **Standard deviation=√326.379=** | **18.06597106** |
|  | **71.23** |  |  |

1. Standardize the data (*refer table above*) and determine the percentage of the data that falls between 40 and 70. (8 mks)

*P (40<=X<=70) =P (-1.73<=Z<=1.51)*

-1.73 Mean=0 1.51

=P(Z>=-1.73) + P(Z<=1.51)= 0.4582+0.4345= 0.8927

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Standard Normal Curve Probability Distribution** | | | | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| The table is based on the upper right 1/2 of the Normal Distribution; total area shown is .5 | | | | | | | | | | |
| The Z-score values are represented by the column value + row value, up to two decimal places | | | | | | | | | | |
| The probabilities up to the Z-score are in the cells | | | | | |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| **Z** | **0.00** | **0.01** | **0.02** | **0.03** | **0.04** | **0.05** | **0.06** | **0.07** | **0.08** | **0.09** |
| **0.0** | 0.0000 | 0.0040 | 0.0080 | 0.0120 | 0.0160 | 0.0199 | 0.0239 | 0.0279 | 0.0319 | 0.0359 |
| **0.1** | 0.0398 | 0.0438 | 0.0478 | 0.0517 | 0.0557 | 0.0596 | 0.0636 | 0.0675 | 0.0714 | 0.0753 |
| **0.2** | 0.0793 | 0.0832 | 0.0871 | 0.0910 | 0.0948 | 0.0987 | 0.1026 | 0.1064 | 0.1103 | 0.1141 |
| **0.3** | 0.1179 | 0.1217 | 0.1255 | 0.1293 | 0.1331 | 0.1368 | 0.1406 | 0.1443 | 0.1480 | 0.1517 |
| **0.4** | 0.1554 | 0.1591 | 0.1628 | 0.1664 | 0.1700 | 0.1736 | 0.1772 | 0.1808 | 0.1844 | 0.1879 |
| **0.5** | 0.1915 | 0.1950 | 0.1985 | 0.2019 | 0.2054 | 0.2088 | 0.2123 | 0.2157 | 0.2190 | 0.2224 |
| **0.6** | 0.2257 | 0.2291 | 0.2324 | 0.2357 | 0.2389 | 0.2422 | 0.2454 | 0.2486 | 0.2517 | 0.2549 |
| **0.7** | 0.2580 | 0.2611 | 0.2642 | 0.2673 | 0.2704 | 0.2734 | 0.2764 | 0.2794 | 0.2823 | 0.2852 |
| **0.8** | 0.2881 | 0.2910 | 0.2939 | 0.2967 | 0.2995 | 0.3023 | 0.3051 | 0.3078 | 0.3106 | 0.3133 |
| **0.9** | 0.3159 | 0.3186 | 0.3212 | 0.3238 | 0.3264 | 0.3289 | 0.3315 | 0.3340 | 0.3365 | 0.3389 |
| **1.0** | 0.3413 | 0.3438 | 0.3461 | 0.3485 | 0.3508 | 0.3531 | 0.3554 | 0.3577 | 0.3599 | 0.3621 |
|  |  |  |  |  |  |  |  |  |  |  |
| **1.1** | 0.3643 | 0.3665 | 0.3686 | 0.3708 | 0.3729 | 0.3749 | 0.3770 | 0.3790 | 0.3810 | 0.3830 |
| **1.2** | 0.3849 | 0.3869 | 0.3888 | 0.3907 | 0.3925 | 0.3944 | 0.3962 | 0.3980 | 0.3997 | 0.4015 |
| **1.3** | 0.4032 | 0.4049 | 0.4066 | 0.4082 | 0.4099 | 0.4115 | 0.4131 | 0.4147 | 0.4162 | 0.4177 |
| **1.4** | 0.4192 | 0.4207 | 0.4222 | 0.4236 | 0.4251 | 0.4265 | 0.4279 | 0.4292 | 0.4306 | 0.4319 |
| **1.5** | 0.4332 | 0.4345 | 0.4357 | 0.4370 | 0.4382 | 0.4394 | 0.4406 | 0.4418 | 0.4429 | 0.4441 |
| **1.6** | 0.4452 | 0.4463 | 0.4474 | 0.4484 | 0.4495 | 0.4505 | 0.4515 | 0.4525 | 0.4535 | 0.4545 |
| **1.7** | 0.4554 | 0.4564 | 0.4573 | 0.4582 | 0.4591 | 0.4599 | 0.4608 | 0.4616 | 0.4625 | 0.4633 |
| **1.8** | 0.4641 | 0.4649 | 0.4656 | 0.4664 | 0.4671 | 0.4678 | 0.4686 | 0.4693 | 0.4699 | 0.4706 |
| **1.9** | 0.4713 | 0.4719 | 0.4726 | 0.4732 | 0.4738 | 0.4744 | 0.4750 | 0.4756 | 0.4761 | 0.4767 |
| **2.0** | 0.4772 | 0.4778 | 0.4783 | 0.4788 | 0.4793 | 0.4798 | 0.4803 | 0.4808 | 0.4812 | 0.4817 |
|  |  |  |  |  |  |  |  |  |  |  |
| **2.1** | 0.4821 | 0.4826 | 0.4830 | 0.4834 | 0.4838 | 0.4842 | 0.4846 | 0.4850 | 0.4854 | 0.4857 |
| **2.2** | 0.4861 | 0.4864 | 0.4868 | 0.4871 | 0.4875 | 0.4878 | 0.4881 | 0.4884 | 0.4887 | 0.4890 |
| **2.3** | 0.4893 | 0.4896 | 0.4898 | 0.4901 | 0.4904 | 0.4906 | 0.4909 | 0.4911 | 0.4913 | 0.4916 |
| **2.4** | 0.4918 | 0.4920 | 0.4922 | 0.4925 | 0.4927 | 0.4929 | 0.4931 | 0.4932 | 0.4934 | 0.4936 |
| **2.5** | 0.4938 | 0.4940 | 0.4941 | 0.4943 | 0.4945 | 0.4946 | 0.4948 | 0.4949 | 0.4951 | 0.4952 |
| **2.6** | 0.4953 | 0.4955 | 0.4956 | 0.4957 | 0.4959 | 0.4960 | 0.4961 | 0.4962 | 0.4963 | 0.4964 |
| **2.7** | 0.4965 | 0.4966 | 0.4967 | 0.4968 | 0.4969 | 0.4970 | 0.4971 | 0.4972 | 0.4973 | 0.4974 |
| **2.8** | 0.4974 | 0.4975 | 0.4976 | 0.4977 | 0.4977 | 0.4978 | 0.4979 | 0.4979 | 0.4980 | 0.4981 |
| **2.9** | 0.4981 | 0.4982 | 0.4982 | 0.4983 | 0.4984 | 0.4984 | 0.4985 | 0.4985 | 0.4986 | 0.4986 |
| **3.0** | 0.4987 | 0.4987 | 0.4987 | 0.4988 | 0.4988 | 0.4989 | 0.4989 | 0.4989 | 0.4990 | 0.4990 |