1E – Using a logarithmic scale to display data

**CONVERTING BETWEEN LOG AND INDEX FORM**

Convert between **log form** and **index form** to fill out the table below:

|  |  |
| --- | --- |
| **Log Form** | **Index Form** |
| Log10(10000) = 4 |  |
|  | 102 = 100 |
| Log10(0.000001) = -6 |  |
|  | 10-3 = 0.001 |

**PERFORMING LOG CALCULTIONS USING A CALCULATOR AND MATHEMATICA**

Use your calculator to find the value of x in the following log equations:

1. x = log10(45) (*HINT: Use log form because you don’t know what the log equals*)
2. log10(x) = 2.7125 (*HINT: Use index form because you do know what the log equals*)
3. x = log10(0.0375)
4. log10(x) = -1.8

*NOTE: There is a Mathematica command for checking your calculations in the Chapter 1 notebook*

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**DISPLAYING CONTINUOUS NUMERICAL DATA USING A LINEAR SCALE HISTOGRAM**

Construct a histogram with a **linear scale** to represent the following data

*The weights of 27 animal species (in kg) are recorded below:*

1.4 470 36 28 1.0 12000 2600 190 520 10 3.3 530 210 62 6700

9400 6.8 35 0.12 0.023 2.5 56 100 52 87000 0.12 190

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| --- | --- |
| **Weight (kg)** | **Frequency** |
| 0 – 9999 |  |
| 10000 – 19999 |  |
|  |  |
| 30000 – 39999 |  |
|  |  |
|  |  |
| 60000 – 69999 |  |
|  |  |
| 80000 – 89999 |  |

**DISPLAYING CONTINUOUS NUMERICAL DATA USING A LOG SCALE HISTOGRAM**

Now construct a histogram with a **log base 10 scale** to represent the same data

First calculate log base 10 of each weight in the data list (to 1 decimal place):

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| --- | --- |
| **log10(weight)** | **Frequency** |
| -2 – 1.01 |  |
| -1 – 0.01 |  |
| 0 – 0.99 |  |
| 1 – 1.99 |  |
| 2 – 2.99 |  |
| 3 – 3.99 |  |
| 4 – 4.99 |  |

*NOTE: There is a Mathematica command for checking your histograms in the Chapter 1 notebook*

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**ANALYSIS QUESTIONS**

1. If a particular animal was at 1.5 on the horizontal scale of the log graph, what does it weigh?

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1. If a particular animal had a weight of 275kg, which interval would it be located in on the log scale histogram?

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1. Describe the log scale histogram in regard to shape, centre and outliers:

SHAPE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CENTRE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

POSSIBLE OUTLIERS: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Which of the two histograms was better suited to this data and why?

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