

1.1 Statistics: The Science and Art of Data Part 2

A variable generally takes values that vary from one individual to another. The **distribution** of a variable tells us what values the variable takes and how often it takes these values.

We can summarize a variable's distribution with a frequency table or a relative frequency table.

A **frequency table** shows the number of individuals having each data value.

A **relative frequency table** shows the proportion or percent of individuals having each data value.

*Part
whole*

To make either kind of table, start by tallying the number of terms that the variable takes each value.

Here are some examples of frequency tables:

Degree	Frequency
High School	2
Bachelor's	7
MBA	20
Master's	3
Law	4
PhD	4
	40

Type of Pet	Tally	Frequency
Dog	### ###	12
Cat	###	7
Goldfish	###	6
Budgie		3
Hamster		2
Lizard		1
Snake		1
Rabbit		3

Find the relative frequency for the frequency table:

Degree	Frequency
High School	2
Bachelor's	7
MBA	20
Master's	3
Law	4
PhD	4
	40

Relative Frequency

$$\begin{aligned} 2/40 &= 0.05 = 5\% \\ 7/40 &= 0.175 = 17.5\% \\ 20/40 &= 0.5 = 50\% \\ 3/40 &= 0.075 = 7.5\% \\ 4/40 &= 0.1 = 10\% \\ &10\% \end{aligned}$$

Find the relative frequency for the frequency table:

Type of Pet	Tally	Frequency
Dog	### ##	12
Cat	###	7
Goldfish	###	6
Budgie		3
Hamster		2
Lizard		1
Snake		1
Rabbit		3

Relative Frequency

$$\begin{aligned} 12/35 &= 0.3428... \approx 34.3\% \\ 7/35 &= 0.2 = 20\% \\ 6/35 &= 0.1714... \approx 17.1\% \\ 3/35 &= 0.0857... \approx 8.6\% \\ 2/35 &= 0.0571... \approx 5.7\% \\ 1/35 &= 0.0285... \approx 2.9\% \\ &\approx 2.9\% \\ &\approx 8.6\% \end{aligned}$$

Total: 35

Example: Create a frequency table and a relative frequency table based on the information below about favorite colors.

Red	Green	White	White	Green	Yellow
Red	Blue	White	White	Yellow	Black
Yellow	White	Green	Red	Black	White
Green	Blue	White	Yellow	White	Yellow

Colors	Tally	Freq.	Relative Freq.
Red		3	$\frac{3}{24} = 0.125 = 12.5\%$
Green		4	$\frac{4}{24} = 0.1666... \approx 16.7\%$
White		8	$\frac{8}{24} = 0.3333... \approx 33.3\%$
Yellow		5	$\frac{5}{24} = 0.2083... \approx 20.8\%$
Blue		2	$\frac{2}{24} = 0.0833... \approx 8.3\%$
Black		2	8.3%
Total: 24			

Example: Create a frequency table and a relative frequency table based on the information below about math test scores.

60	100	40	80	90	60	50	100
60	100	80	40	30	90	50	100
90	100	50	100	30	30	30	30

Scores	Frequency	Relative Freq.
30	5	$\frac{5}{24} = 0.2083 \approx 20.8\%$
40	2	$\frac{2}{24} = 0.0833 \approx 8.3\%$
50	3	$\frac{3}{24} = 0.125 \approx 12.5\%$
60	3	12.5%
70	2	8.3%
80	2	8.3%
90	3	12.5%
100	4	$\frac{4}{24} = 0.1666 \approx 16.7\%$
Total: 24		