Problem of the Week

Problem B and Solution

Measuring Feet - A Great Feat!

Problem

While reading an article in Teen Feat Magazine, Sundip learned that the mean (average) length of an 11-year-old's foot is 22.9 cm. He wondered how many of his 11-year-old friends had "average" feet. Here is the information of the foot lengths, in cm, that he gathered from himself and 11 of his friends:

19.1, 23.3, 21.7, 24.3, 22.1, 22.4, 20.7, 21.9, 22.5, 24.1, 26.4, 24.7

(a) Complete the frequency table below to reveal the number of students with foot lengths within each interval.

Foot Length	Tally	Frequency	Relative Frequency
18.0 - 19.9			
20.0 - 21.9			
22.0 - 23.9			
24.0 - 25.9			
26.0 - 27.9			

(b) What is the mean (average) foot length for Sundip and his friends? How does it compare to the average for 11-year-olds?

(c) Does the information in the table reveal any similarities or differences among the students as to foot length?

(d) Sundip's article also stated that fifty years ago, the average foot length an 11-year-old was about 21.9 cm. How do his friends' sizes compare to those of fifty years ago?

Solution

(a) Here is the completed frequency table.

Foot Length	Tally	Frequency	Relative Frequency
18.0 - 19.9	|	1	$\frac{1}{12} \approx 8.3\%$
20.0 - 21.9	|||	3	$\frac{3}{12} = 25\%$
22.0 - 23.9	||||	4	$\frac{4}{12} \approx 33.3\%$
24.0 - 25.9	|||	3	$\frac{3}{12} = 25\%$
26.0 - 27.9	|	1	$\frac{1}{12} \approx 8.3\%$

(b) To find the mean foot length for Sundip and his friends, we add up all the foot lengths and divide by 12. The sum of the foot lengths is 273.2 cm, and so the average is $\frac{273.2}{12} \approx 22.8$ cm. The average for Sundip and his friends is slightly lower than the average of 22.9 cm for 11-year-olds.

(c) The table reveals that the foot lengths of Sundip and his friends are concentrated in their middle range, with only one person at each end of the possible lengths.

(d) The average foot length of Sundip and his friends is about 1 cm longer than the average of 50 years ago.