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Population standard deviation

QUESTION

The 6 participants in a 200-meter dash had the following finishing times (in seconds).

27, 31, 32, 28, 24, 32

Assuming that these times constitute an entire population, find the standard deviation of the population. Round your answer to two decimal places.

(If necessary, consult a [list of formulas](#).)

① Find the mean

$$\frac{27 + 31 + 32 + 28 + 24 + 32}{6} = 29$$

② Subtract the mean from each data value

$$\begin{aligned} 27 - 29 &= -2 \\ 31 - 29 &= 2 \\ 32 - 29 &= 3 \\ 28 - 29 &= -1 \\ 24 - 29 &= -5 \\ 32 - 29 &= 3 \end{aligned}$$

③ Square that number and add the results

$$\begin{aligned} (-2)^2 &= 4 \\ (2)^2 &= 4 \\ (3)^2 &= 9 \\ (-1)^2 &= 1 \\ (-5)^2 &= 25 \\ (3)^2 &= 9 \\ \hline &52 \end{aligned}$$

④ Divide by how many numbers there are (n) and take the square root

$$\sqrt{\frac{52}{6}} = 2.943920$$

2.94

The formula to calculate the population standard deviation is

$$\sigma = \sqrt{\frac{(x_1 - \mu)^2 + (x_2 - \mu)^2 + (x_3 - \mu)^2 + \cdots + (x_n - \mu)^2}{n}}$$

where $x_1, x_2, x_3, \dots, x_n$ are each piece of data, μ is the population mean, and n is the number of data.

	A	B	C	D	E
1					
2	Data		What you are finding	Answer	Formula
3	27		Population Standard Deviation	2.943920289	=STDEV.P(A3:A8)
4	31				
5	32		Sample Standard Deviation	3.224903099	=STDEV.S(A3:A8)
6	28				
7	24				
8	32				

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