

Topic: Weighted means and grouped data

Question: A website asks visitors to rate their user experience on a scale from 1 to 10, with 1 being the worst experience, and 10 being the best experience. They record 50 responses. Calculate the mean satisfaction score.

Rating	Number of users
1	2
2	1
3	3
4	5
5	7
6	4
7	8
8	7
9	12
10	1

Answer choices:

- A 5.5
- B 5.85
- C 6.44
- D 7.5



Solution: C

We can calculate the weighted sample mean for the user satisfaction scores.

$$\bar{x} = \frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i}$$

$$\bar{x} = \frac{2(1) + 1(2) + 3(3) + 5(4) + 7(5) + 4(6) + 8(7) + 7(8) + 12(9) + 1(10)}{2 + 1 + 3 + 5 + 7 + 4 + 8 + 7 + 12 + 1}$$

$$\bar{x} = 6.44$$

The mean rating is 6.44.



Topic: Weighted means and grouped data

Question: Mark's grade points are 3.0 for English, which corresponds to 4 credits, 4.0 for Physics, which corresponds to 6 credits, 3.5 for Chemistry, which corresponds to 5 credits, and 3.8 for History, which corresponds to 3 credits. Calculate his grade point average.

Answer choices:

- A 3.58
- B 3.61
- C 3.95
- D 4.53



Solution: B

Each subject has its corresponding weight, represented by credits, so we can calculate the weighted grade point average.

$$\bar{x} = \frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i}$$

$$\bar{x} = \frac{(3)(4) + (4)(6) + (3.5)(5) + (3.8)(3)}{4 + 6 + 5 + 3}$$

$$\bar{x} \approx 3.61$$

Mark's grade point average is approximately 3.61.



Topic: Weighted means and grouped data

Question: Given the frequency table of grouped data, calculate the sample mean, variance, and standard deviation.

X	Frequency
1 - 3	2
4 - 6	5
7 - 9	12
10 - 12	4
13 - 15	6

Answer choices:

- A $\bar{x} \approx 8.724$, $s^2 \approx 12.635$, and $s \approx 3.555$
- B $\bar{x} \approx 8.724$, $s^2 \approx 353.793$, and $s \approx 18.809$
- C $\bar{x} \approx 9.036$, $s^2 \approx 12.635$, and $s \approx 3.555$
- D $\bar{x} \approx 9.036$, $s^2 \approx 353.793$, and $s \approx 18.809$



Solution: A

First we need to find the midpoint for each class.

X	Midpoint	Frequency
1 - 3	2	2
4 - 6	5	5
7 - 9	8	12
10 - 12	11	4
13 - 15	14	6

Then the estimate of the sample mean is

$$\bar{x} = \frac{\sum_{i=1}^n f_i M_i}{n}$$

$$\bar{x} = \frac{2(2) + 5(5) + 12(8) + 4(11) + 6(14)}{2 + 5 + 12 + 4 + 6}$$

$$\bar{x} \approx 8.724$$

We can use this mean to estimate the variance of the sample,

$$s^2 = \frac{\sum_{i=1}^n f_i (M_i - \bar{x})^2}{n - 1}$$

$$\sum_{i=1}^n f_i (M_i - \bar{x})^2 = 2(2 - 8.724)^2 + 5(5 - 8.724)^2$$

$$+ 12(8 - 8.724)^2 + 4(11 - 8.724)^2 + 6(14 - 8.724)^2$$

$$\sum_{i=1}^n f_i (M_i - \bar{x})^2 = 353.793104$$



$$s^2 = \frac{353.793104}{29 - 1}$$

$$s^2 \approx 12.635$$

The standard deviation of the sample will be the square root of the variance.

$$s = \sqrt{s^2}$$

$$s \approx \sqrt{12.635}$$

$$s \approx 3.555$$

