

Solutions

2.1

Add the values and divide by the count.

$$\bar{x} = \frac{\sum x}{n} = \frac{4 + 6 + 8 + 10}{4} = 7$$

Mean 7.

2.2

The middle of the five ordered values is 3, so median 3. The most frequent value is also 3, so mode 3.

2.3

Multiply each value by its frequency.

$$\bar{x} = \frac{\sum fx}{\sum f}$$
$$\bar{x} = \frac{1(2) + 2(3) + 4(1)}{2 + 3 + 1}$$

Correct weighted total and count.

$$\bar{x} = \frac{12}{6} = 2$$

Mean 2.

2.4

Original median $m = (4 + 6)/2 = 5$. New median remains 5 because the middle two values are unchanged.

$$\bar{x}_{new} = \frac{2 + 4 + 6 + 80}{4} = 23$$

New mean 23.

3.1

(a) Recover totals from each group.

$$T = n_A \bar{x}_A + n_B \bar{x}_B = 8(65) + 12(75) = 1420$$

Correct total.

$$\bar{x} = \frac{T}{n_A + n_B} = \frac{1420}{20} = 71$$

Combined mean 71.

(b) Subtract the old total from the required new total.

$$x = 21(70) - 1420 = 50$$

Missing score 50. Equal weighting would give each group the same influence despite unequal learner counts.

3.2

(a) Mean uses all five incomes.

$$\bar{x} = \frac{1000 + 1100 + 1200 + 1300 + 6400}{5} = 2200$$

Mean 2200. Median 1200.

(b) Nobody in the supplied list earns 2200; the mean is a total-per-person summary, not a statement that most incomes equal it. The median marks the ordered middle and can describe the centre without claiming all or most incomes equal it.

(c) Recalculate the total after the change.

$$\bar{x}_{new} = \frac{1000 + 1100 + 1200 + 1300 + 8400}{5} = 2600$$

New mean 2600 and median still 1200. The mean rises by 400 because it includes the changed magnitude, while the ordered middle remains unchanged. These five invented records do not represent an entire population.