# Bias, variation and uncertainty

6 questions | 15 marks

Equivalent correct methods earn the corresponding marks.

**1.** Rewrite “Don’t you agree homework is a waste of time?” neutrally. [2 marks]

Remove the suggested judgement.

**Answer:** For example: “How useful do you find homework?” with balanced response options.

**2.** Of 100 invitees, 40 reply and 24 say yes. Find the yes percentage among respondents and state a limitation. [3 marks]

$\frac{24}{40} \times 100 = 60\%.$

The remaining 60 invitees have not supplied answers.

**Answer:** 60%; non-respondents’ views are unknown.

**3.** A fair sample of 40 includes 12 walkers. Estimate the number among 800 students and state a limitation. [3 marks]

$\frac{12}{40} = 0.3.$

$0.3 \times 800 = 240.$

**Answer:** About 240; another fair sample may differ.

**4.** Must one calculation be wrong if two random samples have different means? [2 marks]

Ordinary sampling variation is possible.

**Answer:** No. Different sampled values can correctly produce different means.

**5.** A report calls the single week with the longest queue typical. Explain the concern. [2 marks]

Selective timing can promote a misleading conclusion.

**Answer:** An exceptional selected period may not represent ordinary conditions.

**6.** Give a transparent way to discuss a valid outlier. [3 marks]

Do not silently remove inconvenient valid data.

**Answer:** Report it, examine its effect, and explain any comparison with and without it.