

Solutions

2.1 The totals are 60 and 150, so combined mean is $\bar{x} = (10 \cdot 6 + 15 \cdot 10)/(10 + 15) = 210/25 = 8.4$. Weight each group mean by its size. A voluntary survey can overrepresent people interested in cycling and miss nonrespondents. More responses reduce some random variation but do not automatically remove selection bias. State the target population and how students could be selected before generalising.

3.1 Class widths are 10,20,5. Frequency density is frequency divided by width, giving 0.8,0.6,2; bar areas return 8,12,10. Cumulative frequencies at upper class boundaries 10,30,35 are 8,20,30, starting from (0,0). Midpoints 5,20,32.5 give estimated total $8(5) + 12(20) + 10(32.5) = 605$, hence estimated mean $605/30 = 121/6$, about 20.17. Within-class positions are unknown; the midpoint model estimates their total. Height alone is not frequency when widths differ, and a cumulative curve depends on an interpolation assumption between boundaries.

Local guidance: select and explain the relationship; calculate every requested result; check units, scope, conditions and completeness. These are authored classroom criteria.