Year 8 Statistics – Challenge

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Answers and worked solutions · 8 questions

A. Think like a mathematician

1. **Each value must be multiplied by its frequency: total 66 goals in 24 matches, so the mean is 2.75.**
   Error: the frequencies were ignored
   Total: 66; number of matches: 24
   Mean = 2.75

2. **A full circle is 360°, not 100: 5/20 × 360 = 90°.**
   Error: used 100 instead of 360
   Fraction of the people: 1/4
   1/4 × 360 = 90°

3. **A full circle is 360°, not 100: 4/40 × 360 = 36°.**
   Error: used 100 instead of 360
   Fraction of the people: 1/10
   1/10 × 360 = 36°

4. **No. A large biased sample still misrepresents the population; the sample must also be fair.**
   Try an example
   A large biased sample still misrepresents the population; the sample must also be fair.
   Decide

5. **No. Counter-example: 5, 5, 5 and 0, 5, 10 both have mean 5 but ranges 0 and 10.**
   Try an example
   Counter-example: 5, 5, 5 and 0, 5, 10 both have mean 5 but ranges 0 and 10.
   Decide

6. **No. A pie chart shows parts of a whole at one time; use a line graph or time series for change over time.**
   Try an example
   A pie chart shows parts of a whole at one time; use a line graph or time series for change over time.
   Decide

7. **Player B has the higher mean (64 against 62), so it scored more on average; player B has the smaller range (22 against 35), so its scores were more consistent.**
   Means: 372 ÷ 6 = 62; 384 ÷ 6 = 64
   Ranges: 35 and 22
   Compare an average (centrality) and the range (spread), in context

8. **Advantage: every member has the same chance of being chosen, so it avoids bias. Disadvantage: you need a full list of the population, and it can take time.**
   Think about bias and how representative the sample is
   Advantage: every member has the same chance of being chosen, so it avoids bias
   Disadvantage: you need a full list of the population, and it can take time