



H25-10min Recognising Misleading Graphs (Higher): 10-minute Pack

EDEXCEL 1ST0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A student is investigating whether a histogram drawn with unequal class widths gives a fair impression of some grouped data.

List four checks the student could use to help decide whether the histogram might be misleading. At least one of your checks must relate specifically to histograms with unequal class widths.

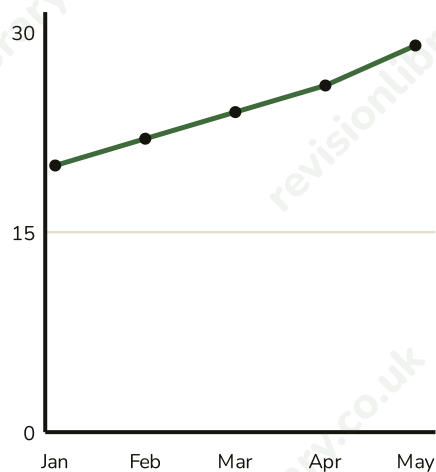
(Total for Question 1 is 4 marks)

- 2 A phone company records the number of app downloads (thousands) over five months.

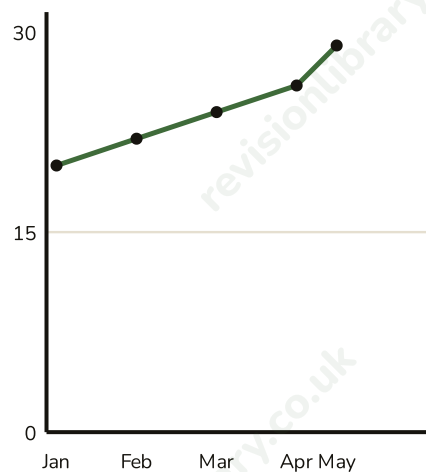
Month	Jan	Feb	Mar	Apr	May
Downloads (1000s)	20	22	24	26	29

Graph R plots this data with the five months spaced equally along the horizontal axis. Graph S plots the same data and the same vertical axis, but the horizontal gap between April and May is drawn much narrower than the equal gaps used between the earlier months.

Graph R (fair)



Graph S



- (a) Work out the percentage increase in downloads from April to May. (2)
- (b) Explain how compressing the horizontal gap between April and May, while keeping the same vertical axis, could make this increase look more dramatic than it really is. (2)
- (c) Suggest how the company should space the months on the horizontal axis to give a fair impression of the trend, and explain why. (2)

(Total for Question 2 is 6 marks)

Mark scheme · H25-10min Recognising Misleading Graphs (Higher): 10-minute Pack

Question 1

- **B1** Is frequency density (frequency divided by class width), rather than frequency, plotted on the vertical axis for classes of unequal width?
- **B1** Does the area of each bar (not just its height) correctly represent the frequency for that class?
- **B1** Does the vertical axis start at zero, with equally spaced numbers marked on it?
- **B1** Is the chart clearly labelled with a title, units and axis labels, so the class widths cannot be misread? (oe - accept any four valid checks, e.g. whether bars are drawn to a consistent scale, or whether the sample size/source is stated)
- **Answer: e.g. (1) Is frequency density plotted, not frequency, for unequal-width classes? (2) Does bar area represent frequency? (3) Does the vertical axis start at 0 with equal intervals? (4) Is the chart fully labelled?**

Question 2

- (a) **M1** $(29-26)/26 \times 100$, oe
- (a) **A1** awrt 11.5%
- (a) **Answer: 11.5%**
- (b) **B1** identifies that squeezing the horizontal distance between April and May, while the vertical rise stays the same size, makes that part of the line much steeper on the page than the earlier, equally-spaced months
- (b) **B1** explains a reader could interpret this steep, near-vertical section as a sudden dramatic jump, when the true increase (about 11.5%) is only slightly bigger than the rate of increase in the earlier, fairly spaced months (each about 1 percentage point higher than the last)
- (b) **Answer: Compressing the April-May gap keeps the same vertical rise but squeezes it into a much shorter horizontal distance, so the line becomes much steeper there than in the rest of the graph; a reader could easily read this as a sudden, dramatic surge, when the true increase of about 11.5% is only a little larger than the roughly steady rate of increase shown in the earlier months.**
- (c) **B1** suggests spacing all five months equally along the horizontal axis (in proportion to the equal time gap between each pair of months)
- (c) **B1** explains that equal time gaps mean the slope drawn between each pair of points fairly reflects the true rate of change, so no part of the trend is exaggerated relative to another
- (c) **Answer: Space Jan, Feb, Mar, Apr and May equally along the horizontal axis, since each represents the same one-month time gap; this way, the steepness of the line between any two months fairly reflects the true rate of change, and no single month-to-month rise is exaggerated compared with the others.**