



H20-10min Skewness: 10-minute Pack

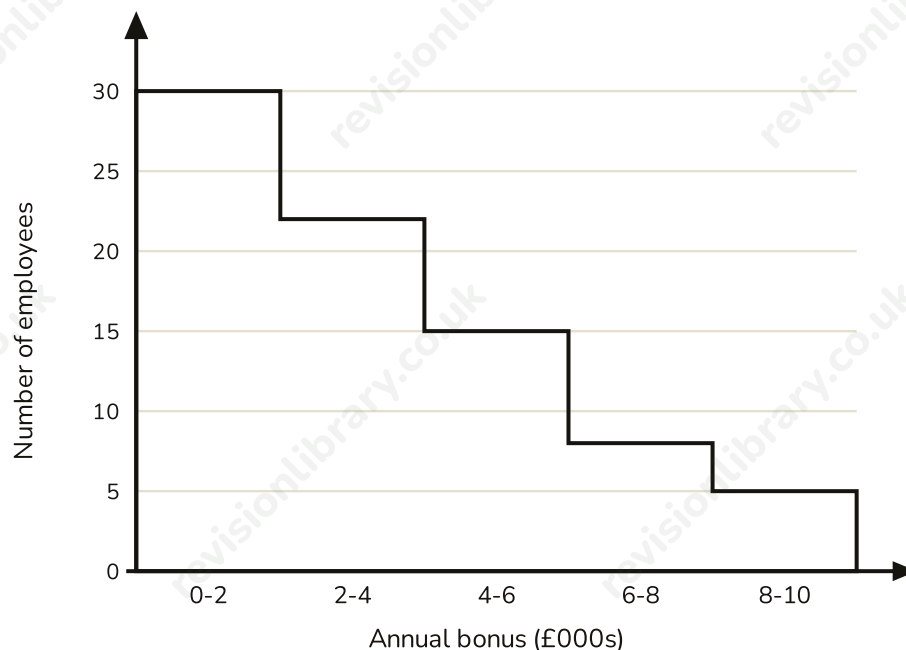
EDEXCEL 1ST0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

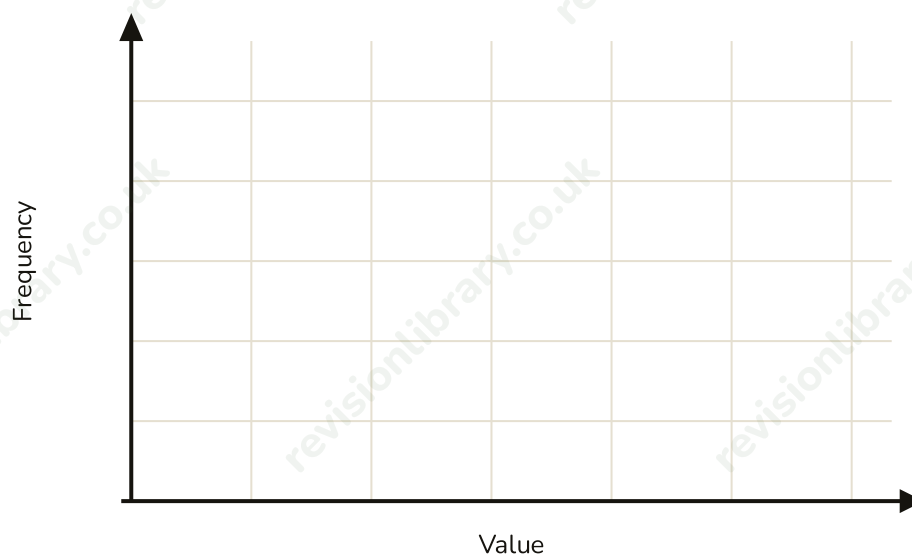
- 1** The histogram shows the annual bonus payments, in £, received by 80 employees at a company.



- (a) State whether the distribution of bonus payments is symmetric, positively skewed or negatively skewed. (1)
- (b) Give two features of the histogram's shape that support your answer to part (a). (2)
- (c) State whether the mean bonus payment would be greater than, less than, or about equal to the median bonus payment. Give a reason for your answer. (1)

(Total for Question 1 is 4 marks)

- 2 The ages at which employees retire from a large company are known to be negatively skewed: most employees retire close to the official retirement age, with a small number retiring much earlier. On the blank axes provided, sketch a frequency curve to show this negatively skewed distribution. Label the position of the peak and the direction of the tail.



(Total for Question 2 is 3 marks)

- 3** The box plot shows the delivery times, in minutes, of 50 parcels handled by a courier company.



- (a)** Write down the median delivery time. **(1)**

- (b)** Work out the interquartile range. **(1)**

- (c)** By comparing median - lower quartile with upper quartile - median, state, giving a reason, whether the distribution of delivery times is symmetric, positively skewed or negatively skewed. **(2)**

(Total for Question 3 is 4 marks)

Mark scheme · H20-10min Skewness: 10-minute Pack

Question 1

- (a) **B1** Positively skewed cao
- (a) **Answer: Positively skewed**
- (b) **B1** the tallest bar (the peak, frequency 30) occurs in the lowest bonus class (£0-2000)
- (b) **B1** frequencies decrease gradually across the remaining four classes (22, 15, 8, 5), giving a long tail stretching towards the higher bonus payments
- (b) **Answer: The peak (30) is in the lowest class, and frequencies fall away gradually across the higher classes, giving a tail towards the larger bonuses.**
- (c) **B1** Greater than - the small number of employees with much higher bonuses (the long tail) pulls the mean upward, while the median is unaffected by how far these extreme values are from the centre
- (c) **Answer: Greater than the median**

Question 2

- **B1** a single smooth, unimodal curve drawn (one peak, not multiple humps)
- **B1** peak positioned towards the higher end of the value axis, with a longer tail stretching towards the lower values (a negatively skewed shape)
- **B1** the peak and the direction of the tail are clearly labelled on the sketch
- **Answer: A smooth, single-peaked curve with its peak towards the higher end of the value axis (near the official retirement age) and a longer tail stretching towards the lower values, with the peak and tail direction labelled.**

Question 3

- (a) **B1** 15 cao
- (a) **Answer: 15**
- (b) **B1** 20 cao
- (b) **Answer: 20**
- (c) **M1** $15 - 12 (=3)$ compared with $32 - 15 (=17)$, oe
- (c) **A1** Positively skewed - the upper quartile is much further from the median than the lower quartile is, so the longer delivery times are more spread out cao
- (c) **Answer: Positively skewed**