

Exercise walk-through

7.1

Representing and summarising data

Pearson Edexcel · International A-Level · Further Mathematics

Exercises 2.1·2.3

2.1 A histogram class of width 4 contains 24 items; an adjacent class of width 2 contains 18 items. Which bar is taller, and by what factor? [2]

2.2 For a grouped sample of 80 with cumulative frequencies 20, 50, 68, 80 at class boundaries 0, 10, 20, 30: estimate the median. [3]

2.3 Estimate the number of items between the values 12 and 26 given the classes 10–20 (30 items) and 20–30 (18 items), assuming uniform spread. [4]

Exercises 2.1·2.3

2.1 A histogram class of width 4 contains 24 items; an adjacent class of width 2 contains 18 items. Which bar is taller, and by what factor? [2]

2.1 Densities: $24/4 = 6$ versus $18/2 = 9$: the width-2 class's bar is taller, by a factor $\frac{9}{6} = 1.5$.

2.2 For a grouped sample of 80 with cumulative frequencies 20, 50, 68, 80 at class boundaries 0, 10, 20, 30: estimate the median. [3]

2.2 The median is the 40th value, in the second class (cumulative $20 \rightarrow 50$): $10 + 10 \times \frac{40-20}{30} = 16.7$.

2.3 Estimate the number of items between the values 12 and 26 given the classes 10–20 (30 items) and 20–30 (18 items), assuming uniform spread. [4]

2.3 $30 \times \frac{8}{10} + 18 \times \frac{6}{10} = 24 + 10.8 = 34.8$, so about **35** items.

Exercise 3.1

3.1 (*Edexcel IAL WST01 June 2025 Q5, condensed.*) The speeds of a random sample of 225 cars are summarised: $20 \leq x < 25$ (54), $25 \leq x < 30$ (90), $30 \leq x < 40$ (60), $40 \leq x < 55$ (15), $55 \leq x < 70$ (6). A histogram is drawn and the tallest bar is 10 cm. (a) Calculate the height of the second-tallest bar. (b) Estimate the number of cars with speeds between 35 and 57 km/h. (c) Use linear interpolation to estimate the median speed. (d) Given the lower quartile is 25.14, find the upper quartile and the interquartile range.

[11]

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3.1 (a) Densities 10.8, 18, 6, 1, 0.4: tallest is 25–30; second tallest is 20–25: $\frac{10.8}{18} \times 10 = 6$ cm. (b) $60 \cdot \frac{5}{10} + 15 + 6 \cdot \frac{2}{15} = 30 + 15 + 0.8 = 45.8$, so 46 cars. (c) The median is the 112.5th value, in 25–30 (cumulative 54 $\rightarrow$ 144): $25 + 5 \times \frac{112.5-54}{90} = 28.25$. (d) Q_3 is the 168.75th value, in 30–40: $30 + 10 \times \frac{168.75-144}{60} = 34.125$; $IQR = 34.125 - 25.14 = 8.985$.

Exercise 3.2

3.2 (*Original.*) For the same sample, (a) describe the skewness using the quartiles, and (b) comment on a schoolmate's claim that a Normal distribution models these speeds well. [5]

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3.2 $(Q_3 - Q_2) = 5.875 > (Q_2 - Q_1) = 3.11$, so positively skewed (the estimated mean $30.6 >$ median 28.25 agrees). A Normal model is not suitable: the distribution is not symmetric.

Local review guidance: densities computed as f/w before any comparison; ratio argument for heights; interpolation fractions using the correct cumulative frequency. This is authored classroom guidance.