Section 2: Data presentation and interpretation

Exercise level 1 solutions

1. (i)   1 2②3 4④5 6⑦8 8

   > The number of items is odd, so the median is the central value. To find the quartiles, find the median of the data each side, not including the median

   Median = 4
   LQ = 2, UQ = 7
   Interquartile range = 5

   (ii) 11 12 13 | 13 14 16 | 17 18 18 | 19 20 22

   > The number of items is even, so split the list into two equal halves. The median is halfway between 16 and 17

   Median = 16.5
   LQ = 13, UQ = 18.5
   Interquartile range = 5.5

   (iii) 16 28 29 | 32 32 36 ㊹ 48 52 56 | 58 71 78

   Median = 44
   LQ = 30.5, UQ = 57
   Interquartile range = 26.5

   (iv) 63 65 68 ⑦②74 75 76 | 78 79 81 ⑧①88 89 92

   Median = 77
   LQ = 72, UQ = 81
   Interquartile range = 9

2. (i)   Mean $= \dfrac{(0 \times 44) + (1 \times 33) + (2 \times 16) + (3 \times 5) + (4 \times 1) + (6 \times 1)}{100}$

   $= 0.9$

   Median is halfway between 50th and 51st values. Both of these are 1 so the median is 1.
   Mode = 0
   Midrange $= \dfrac{0 + 6}{2} = 3$

   (ii) The midrange is not very representative, because the data are very skewed.
   The mode, median and mean are all fairly representative.

3. IQR = 43 – 15 = 28
   UQ + 1.5 ×IQR = 43 + 1.5×28 = 85
   LQ - 1.5 ×IQR = 15 - 1.5×28 = -27
   So the only outlier is 93.

Edexcel AS Maths Data 2 Exercise

4. (i) Using a calculator, mean = 3.65 kg (3 s.f.)
Standard deviation = 1.03 kg (3 s.f.)

(ii) Mean + 2×sd = 5.71
Mean – 2×sd = 1.59
So 5.81 kg and 1.36 kg are outliers.

5. (i)

Height h (cm)	Frequency
$120 \leq h < 130$	10
$130 \leq h < 140$	52
$140 \leq h < 145$	41
$145 \leq h < 150$	33
$150 \leq h < 160$	8
$160 \leq h < 170$	2
Total	146

(ii)

Mid-interval h	Frequency	hf	h^2f
125	10	1250	156250
135	52	7020	947700
142.5	41	5842.5	832556.25
147.5	33	4867.5	717956.25
155	8	1240	192200
165	2	330	54450
Total	146	20550	2901112.5

You can enter the mid-interval values and frequencies into your calculator and use the statistical functions to find the mean and standard deviation directly, rather than writing out the whole table like this.

$$\text{Estimate of mean} = \frac{20550}{146} = 140.8 \ (1 \ \text{d.p.})$$

$$\text{Estimate of standard deviation} = \sqrt{\frac{2901112.5 - 146 \times 140.753^2}{146}}$$

$$= 7.7 \ (1 \ \text{d.p.})$$

(iii) Need to split the histogram so that each part has area 73.
First two bars have total area 62.
Third bar (140 – 145) has area 41.
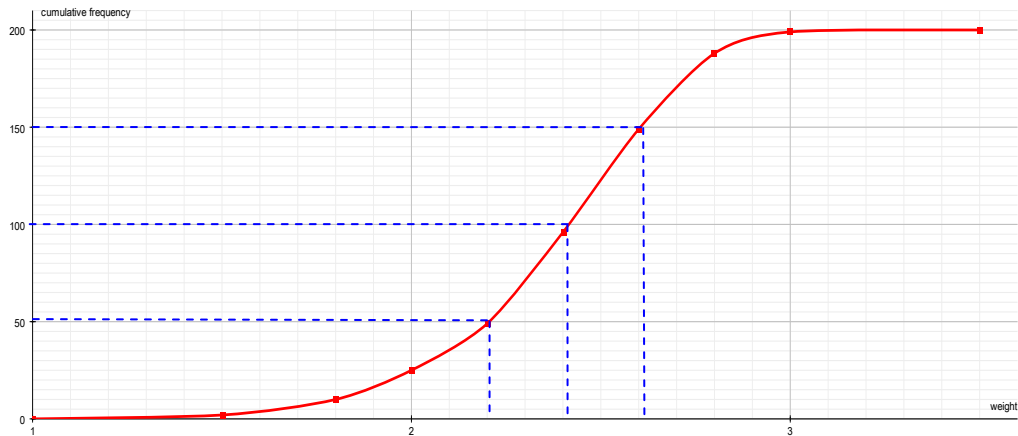Need to split this bar so that the left-hand part has area 11.

The height is 8.2 so the width of this part is $\dfrac{11}{8.2} = 1.34$

The bar starts at 140 cm so the split is at 141.34

The median is 141.3 cm (1 d.p.)

6. (i)

Median = 2.4

LQ = 2.2, UQ = 2.6 so IQR = 0.4

(ii) From the graph approximately 80 people estimated less than 2.35, so 120 people overestimated. This is 60%.