

Cumulative Frequency and Quartiles

On a cumulative frequency graph, a number on the vertical axis shows the number of items LESS THAN the corresponding value on the horizontal axis.

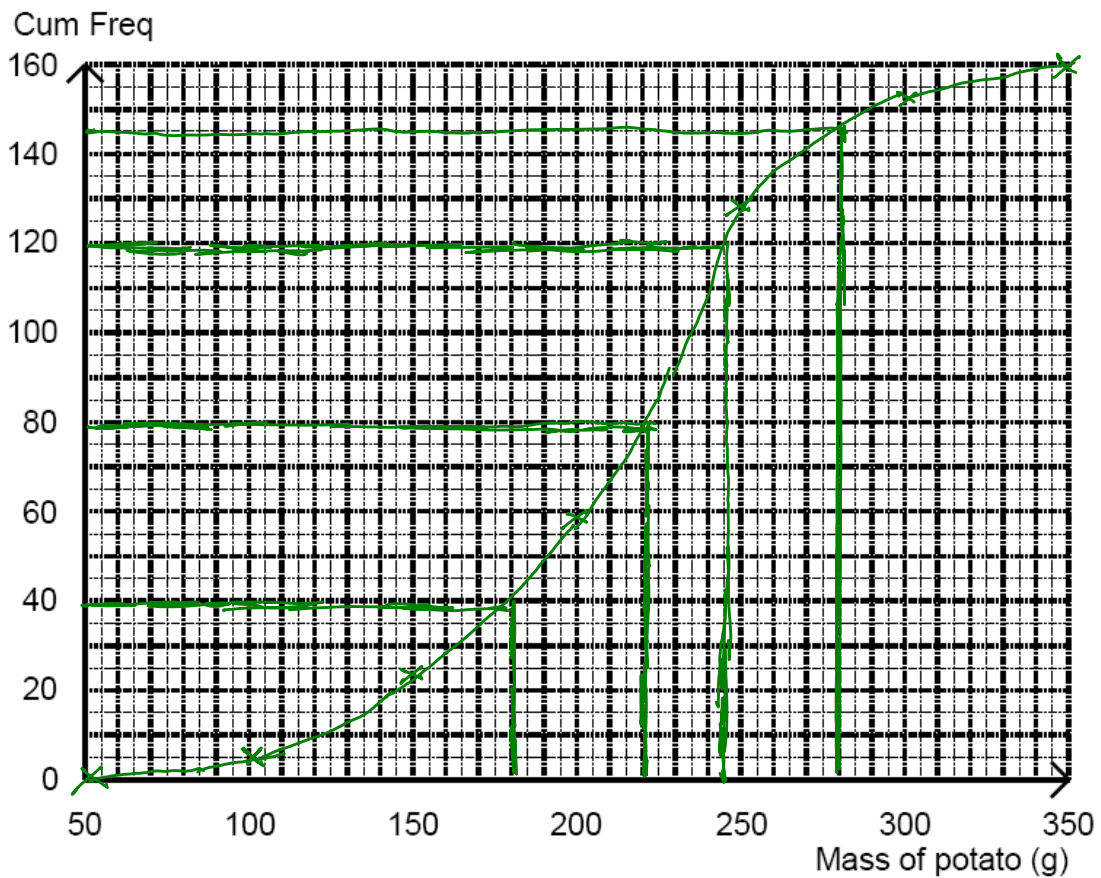
So we plot the points at the end of each class interval

Example: The masses of a sample of 160 Estima potatoes are as shown below:

Mass (g)	Frequency
50-100	5
100-150	18
150-200	36
200-250	70
250-300	24
300-350	7

Mass	Cumulative Frequency
$50 \leq m < 100$	5
$50 \leq m < 150$	23
$50 \leq m < 200$	59
$50 \leq m < 250$	129
$50 \leq m < 300$	153
$50 \leq m < 350$	160

(a) Calculate the cumulative frequencies and draw a cumulative frequency graph.



(b) Use your graph to estimate the percentage of potatoes which have a mass of over 275g

145 potatoes less than 275g
 $160 - 145 = 15$ potatoes over 275g

$$\frac{15}{160} \times 100 = \underline{\underline{9.4\%}}$$

Median and Quartiles

The **median** is one way of showing the **average** of the data.

The **interquartile range** is a way of showing the **spread** or **variation** in the data.

To find the median, draw a line across at $\frac{1}{2}$ the total frequency, and read down.

To find the quartiles, draw lines at $\frac{1}{4}$ and $\frac{3}{4}$ of the total frequency

Example (continued)

(c) Find the median mass of these potatoes.

(Draw line across at 80)

$$\text{Median} = \underline{\underline{220\text{g}}}$$

(d) Find the quartiles and interquartile range of these potatoes

(Draw lines at 40 and 120)

$$\text{Lower Quartile} = 180\text{g}$$

$$\text{Upper Quartile} = 245\text{g}$$

$$\text{Interquartile Range} = 245 - 180 = \underline{\underline{65\text{g}}}$$

(e) A sample of Desiree potatoes gave the following results:

$$\text{Median} = 195\text{g}$$

$$\text{Interquartile range} = 92\text{g}$$

Use these values to make two comments comparing Estima and Desiree potatoes.

On average, Desiree potatoes are smaller (have less mass) than Estima potatoes.

There is more variation in size with Desiree potatoes (greater spread of masses)
(because the interquartile range is larger)