Year 11 : Numeracy Mock Prep

Paper 1 : No Calculator Sheet 2

1) A leaf on a tree has an average weight of 0·06g.

a) What is this in standard form? 6×10^{-2} g

b) The weight of all the tree's leaves in total is 18·9kg. Calculate how many leaves are on the tree.

$18{\cdot}9\text{kg} = 18900\text{g} = 1{\cdot}89 \times 10^{4}\text{g}$

$\therefore \frac{1{\cdot}89 \times 10^{4}}{6 \times 10^{-2}} = 0{\cdot}315 \times 10^{6} = 3{\cdot}15 \times 10^{5}$

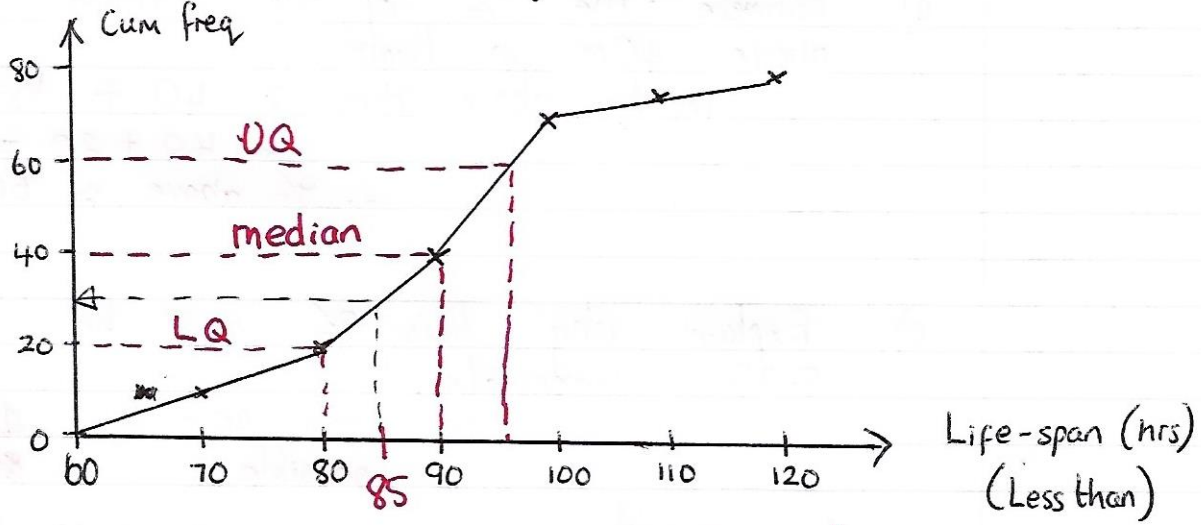
c) If this number of leaves is the average for any tree of this type calculate the weight of all the leaves in a woodland which has 2×10^{5} such trees.

$3{\cdot}15 \times 10^{5} \times 2 \times 10^{5}$

$= 6{\cdot}3 \times 10^{10}$ g

$= 6{\cdot}3 \times 10^{7}$ kg

2) The diagram is a cumulative frequency polygon showing the life-span of a number of light-bulbs.



a) Estimate the median life-span. 80 results ⇒ median is 40th

median = 90 hrs

b) Estimate the interquartile range LQ = 80, UQ = 96 IQR = 95 − 80 ≈ 15 hours

c) Estimate how many bulbs lasted less than 85 hours. 30 bulbs

d) Estimate the % of bulbs that lasted MORE than 95 hours.

Number less than 95 hours ≈ 60

∴ Number more than 95 hours ≈ 80 − 60 ≈ 20

∴ % more than 95 hours ≈ $\frac{20}{80} \approx \frac{1}{4} \approx 25\%$

3) The table below shows the height in metres of a number of buildings in a town.

Height (m)	(n) Width / Frequency (AREA)	Height / Freq Density
$0 < h < 10$	20	$20/10 = 2$
$10 \leq h < 20$	80	$80/10 = 8$
$20 \leq h < 30$	60	$60/10 = 6$
$30 \leq h < 50$	40	$40/20 = 2$
$50 \leq h < 100$	~~40~~	$40/50 = 0.8$
	240	

a) Complete the frequency density table

b) Draw a histogram See below

c) Estimate the median height of a building.

240 buildings. Median is 120'th height.

Need 20 from 3rd interval to make 120. ($\frac{1}{3}$ of 60)

$\therefore$ $\frac{1}{3}$ of 10m = 3·3m $\therefore$ Height = 20 + 3·3 = 23·3m

d) Estimate the % of the buildings that are above 40m in height.

Number above 40m $\approx$ 40 + $\frac{1}{2}$ of $30 \leq h < 50$

$\approx$ 40 + 20 = 60

$\therefore$ % above $\approx$ $60/240 = \frac{1}{4} = 25\%$.

e) Explain why this % could be as much as 8·3% inaccurate.

Min Above 40m $\Rightarrow$ possible ~~40~~ from $50 \leq h < 100$

$\therefore$ ~~20~~ 20 less than previous answer

ie $\frac{1}{3}$ less.

25% ÷ 3 = 8·3%

b)