Year 10 higher topic 14

Further statistics

Random sampling

Every member of the population has an equal chance of being chosen.

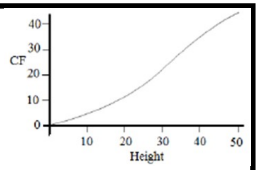
Stratified sampling

A sample where the number of people chosen from each strata (group) is in proportion to the size of the group.

What careers would use these skills?

Statistician, economist, software engineer, scientist, business analyst, financial analyst, market research, actuary, cost estimator, medical trials.

Cumulative frequency



Cumulative frequency is a running total.

Age	Frequency	Cumulative Frequency
$0 < a \leq 10$	15	15
$10 < a \leq 40$	35	$15 + 35 = 50$
$40 < a \leq 50$	10	$50 + 10 = 60$

Plot the cumulative frequency at the end point of the interval.

The graph should always increase, it should never drop down.

Quartiles, median and IQR from stem and leaf

STEM	LEAF
0	7
1	0 5 5 5 7 9
2	0 2 2 6 7
3	0 2 4 6 8

Key : 6 | 1 = 61 hours

Median = 22

LQ = 15

UQ = 31

IQR = 31—15 = 16

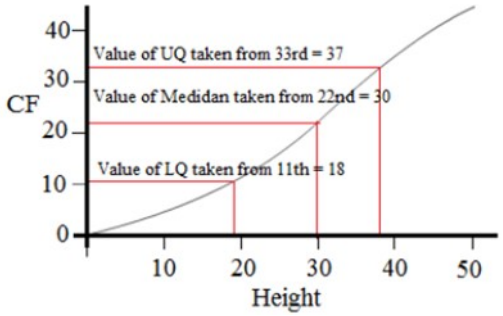
Quartiles, median and IQR from a cumulative frequency graph

Lower Quartile (Q1): 25% of the data is less than the lower quartile.

Median (Q2): 50% of the data is less than the median.

Upper Quartile (Q3): 75% of the data is less than the upper quartile.

Interquartile range (IQR): represents the middle 50% of the data.

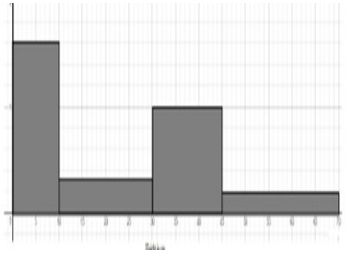


Histograms

A visual way to display frequency data using bars, the bars can be unequal in width. Histograms show frequency density on the y-axis, not frequency. The area of the bar is proportional to the frequency of that class interval.

Height(cm)	Frequency	Frequency Density (FD)
$0 < h \leq 10$	8	$8 \div 5 = 1.6$
$10 < h \leq 30$	6	$6 \div 20 = 0.3$
$30 < h \leq 45$	15	$15 \div 15 = 1$
$45 < h \leq 70$	5	$5 \div 25 = 0.2$

FD = frequency / class width



Comparing box plots

Write two sentences.

1) Compare medians for the two sets of data.

2) Compare the spread of data using the range or IQR

You need to compare the box plots in the context of the problem.

Box plots

The minimum, lower quartile, median, upper quartile and maximum are shown on a box plot.

A box plot can be drawn independently or from a cumulative frequency diagram.

Eg. Students sit a maths test. The highest score is 19, the lowest score is 8, the median is 14, the lower quartile is 10 and the upper quartile is 17. Draw a box plot to represent this information.