

Guidance for tutors

Outcome	S6	Student can consistently:	Draw and interpret a box (and whisker) diagram.										
How the topic is examined	<ul style="list-style-type: none">Examed through test paper questions.This topic is equally likely to appear on calculator and non-calculator papers.There are two possible questions that could be asked.<ul style="list-style-type: none">Draw a box plot given summary informationDraw a box plot based on information from a cumulative frequency diagram.In addition students are often asked to compare two distributions based on two box plots.												
Prior knowledge	<ul style="list-style-type: none">Students should be confident with:<ul style="list-style-type: none">Cumulative frequency diagrams (S5)Mean, median and mode of data (S2)												
Suggested tuition approaches	<div><div><ul style="list-style-type: none">These diagrams are generally referred to as box plots in examinations, although sometimes they are called box and whisker plots. Either way students would draw the same diagram.A box plot is a way of showing how a set of data is distributed.A box plot contains the following pieces of information; smallest value, lower quartile (LQ), median, upper quartile (UQ) and largest value. From this you can work out the range and interquartile range (IQR) for the data.<p>The box and whisker plot is drawn for the following data.</p><table><tr><td>Smallest Value</td><td>12</td></tr><tr><td>Lower Quartile</td><td>25</td></tr><tr><td>Median</td><td>33</td></tr><tr><td>Upper Quartile</td><td>46</td></tr><tr><td>Largest Value</td><td>82</td></tr></table><p>The range = $82 - 12 = 70$</p></div><div></div></div>			Smallest Value	12	Lower Quartile	25	Median	33	Upper Quartile	46	Largest Value	82
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	<p>The IQR = $46 - 25 = 21$</p> <ul style="list-style-type: none"> Students may be asked to draw this from data they get from a cumulative frequency diagram. Occasionally questions ask you to find information from the box plot (e.g. what is the lower quartile? What value does 25% of the data lie below? What is the range for the middle 50% of the data?) Students are also asked to compare two box and whisker plots. Students are expected to make two comments: <ul style="list-style-type: none"> Comment 1 – comparison of the median – “On average are slower/heavier/better etc... because the median is larger than the median of Comment 2 – compare the interquartile range – “..... is more consistent because they have a lower IQR” A nice worked example of this is provided here http://www.mathslearn.co.uk/GCSErevision/GCSEcomparingboxandwhiskerplots.htm
Common errors and misconceptions	<ul style="list-style-type: none"> Students make lots of mistakes reading off values from the scale. Encourage them to work out what one small square represents before they start the question. They plot the wrong values in the wrong place. Ask them to double check their working. When comparing two distributions they make two comments about the median and two about the range/IQR. (e.g. The girls on average are quicker and the boys on average are slower are the same comment). Students should understand that they need to make one comment about the median (average) and one comment about the interquartile range. It is better to compare the IQR as opposed to the range of the data. The range can include extreme values that might skew the data.
Suggested resources	<ul style="list-style-type: none"> Questions <ul style="list-style-type: none"> http://www.cimt.org.uk/projects/mepres/book9/bk9i16/bk9_16i4.html https://corbettmaths.files.wordpress.com/2013/02/cumulative-frequency-pdf1.pdf Past GCSE Questions <ul style="list-style-type: none"> https://keshgcsemaths.files.wordpress.com/2013/11/91_cumulative-frequency-and-box-plots.pdf Video tutorial <ul style="list-style-type: none"> http://corbettmaths.com/2013/05/15/drawing-and-reading-box-plots/

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- <http://corbettmaths.com/2013/05/15/comparing-box-plots/>