

Guidance for tutors

Outcome	S3	Student can consistently:	Draw and interpret a scatter diagram.
How the topic is examined	<ul style="list-style-type: none"> Examined through test paper questions. This question can appear on calculator or non-calculator papers. Students may be asked to complete a scatter diagram, state the correlation shown, draw a line of best fit and use the line to estimate a particular value. 		
Prior knowledge	<ul style="list-style-type: none"> Students should be confident: <ul style="list-style-type: none"> Plotting points. In addition questions involving this topic can have links to: <ul style="list-style-type: none"> Finding the gradient and equation of a straight line (AG4) 		
Suggested tuition approaches	<ul style="list-style-type: none"> It is likely that students may be asked to draw or complete a scatter diagram. If this is the case students should just plot all the points of the ones that are remaining. Following this students may be asked; <ul style="list-style-type: none"> To state the type of correlation (if any) that the diagram shows. The correlation may be positive, negative or no correlation. The following link provides a summary of the types of correlation http://www.bbc.co.uk/schools/gcsebitesize/maths/statistics/scatterdiagramsrev2.shtml To determine the strength of the correlation. Words that are usually used are very strong, strong, fair, weak, and no correlation. The strength of the correlation is determined by how close to a straight line the points are. To write down the relationship between the two variables (e.g. as the height increases the weight increases, as the temperature decreases the number of cups of tea sold increases) To draw a line of best fit through the middle of the data. This is drawn by eye at GCSE. This is a straight line that passes though as many points as possible and keeps roughly the same number of points either side. The aim is to try and minimise the distance that the points are away from the line. To use the line of best fit to estimate a certain value of one of the variables given the value of the other variable (e.g. Estimate the height of a pumpkin given the weight is 19.5kg) This topic can be deceptively straight forward but students often make some basic mistakes (see below) For the highest attaining student you might want to get them to calculate the equation of the line of best fit (See AG4) 		

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	<ul style="list-style-type: none"> In addition discussion around the reliability of estimates may be discussed. <ul style="list-style-type: none"> Interpolation – this is where the value given is within the range of data. This is reliable as long as there is strong correlation. Extrapolation – this is where the value given is out of the range of data on the graph. This can be reliable if it is just out of range and there is strong correlation. However if the value is further away from the data on the graph then you are assuming that the trend continues. You cannot always assume this, therefore any estimate would be unreliable and should be treated with caution.
Common errors and misconceptions	<ul style="list-style-type: none"> Students often think that the line of best fit should pass through the origin (0, 0). This is not always the case. When drawing a line of best fit they end up with a line that doesn't go through the middle of the data. Encourage them to use a ruler and move it up and down to get the best line. By eye there is not just one answer for the line of best fit. Students will be allowed to give an answer within a range. When asked to estimate one variable given the value of the other, students don't always draw a line of best fit. Encourage them to always do so when providing an estimate. Sometimes students confuse the relationship and correlation. Marks are rarely awarded if students are asked for the relationship between two variables and a student writes 'positive correlation'.
Suggested resources	<ul style="list-style-type: none"> Questions <ul style="list-style-type: none"> https://corbettmaths.files.wordpress.com/2013/02/scatter-graphs-pdf1.pdf http://www.cimt.org.uk/projects/mepres/book9/bk9i8/bk9_8i3.html Past GCSE Questions <ul style="list-style-type: none"> https://keshgcsemaths.files.wordpress.com/2013/11/47_scatter-graphs2.pdf Video tutorials <ul style="list-style-type: none"> http://corbettmaths.com/2012/08/10/scatter-graphs/ http://corbettmaths.com/2012/08/10/scatter-graphs-correlation/