CAIE Physics A-Level

Paper 5: Analysis, Conclusions and Evaluation
(Also requires Paper 3 knowledge)

Flashcards

On a graph of *y* against *x*, a line with the equation y = mx + c is plotted. How would you find the constant **m**?

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m = Gradient

=> Find the change in y in relation to the change in x.

On a graph of *y* against *x*, a line with the equation y = mx + c is plotted. How would you find the constant **c**?

On a graph of *y* against *x*, a line with the equation y = mx + c is plotted. How would you find the constant **c**?

c = Y-intercept

=> Find where the line crosses the y-axis (where x=0).

On a graph of *log y* against *log x*, a line with the equation $y = ax^n$ is plotted. How would you find the constant **a**?

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log a = Y-intercept

$$\Rightarrow a = \log^{-1}(\text{y-intercept})$$

On a graph of *log y* against *log x*, a line with the equation $y = ax^n$ is plotted. How would you find the constant **n**?

On a graph of *log y* against *log x*, a line with the equation $y = ax^n$ is plotted. How would you find the constant **n**?

n = Gradient

=> Find the change in y in relation to the change in x.

On a graph of *In y* against *x*, a line with the equation $y = ae^{kx}$ is plotted. How would you find the constant **a**?

On a graph of *ln y* against *x*, a line with the equation $y = ae^{kx}$ is plotted. How would you find the constant **a**?

ln a = Y-intercept

=> a = ln^{-1}(y-intercept)

On a graph of *ln y* against *x*, a line with the equation $y = ae^{kx}$ is plotted. How would you find the constant **k**?

On a graph of *ln y against x*, a line with the equation $y = ae^{kx}$ is plotted. How would you find the constant **k**?

k = Gradient

=> Find the change in y in relation

to the change in x.

What are error bars?

What are error bars?

Error bars are drawn on graphs around data points or trend lines to give a visual representation of uncertainty.

How do error bars relate to the line of best fit?

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The line of best fit should pass through **all** error bars (excluding anomalous points).

What is a worst acceptable straight line for a given graph?

What is a worst acceptable straight line for a given graph?

The worst acceptable straight line (or the line of worst fit) is the steepest or shallowest line possible that still passes through all the error bars in a graph.

When drawing lines, how do you distinguish the line of best fit from the worst acceptable straight line?

When drawing the lines, how do you distinguish the line of best fit from the worst acceptable straight line?

The worst acceptable straight line should be drawn dashed and labelled. The line of best fit should just be a solid line.

How would you work out the units to a constant you have calculated from the gradient of a graph?

How would you work out the units to a constant you have calculated from the gradient of a graph?

1. Work out the units of the gradient: the y-axis units divided by the x-axis units.
2. Use this and the units of quantities the constant is divided or multiplied by to find the units of the constant.

How would you work out the units to a constant you have calculated from the y-intercept of a graph?

How would you work out the units to a constant you have calculated from the gradient of a graph?

1. Work out the units of the y-intercept: the units of the y-axis.

2. Use this and the units of quantities the constant is divided or multiplied by to find the units of the constant.

What determines the level of precision of your y-intercept?

What determines the level of precision of your y-intercept?

The y-intercept should be to the same level of precision as the y-axis scale and any plotted y-value.

What determines the level of precision of your gradient?

What determines the level of precision of your gradient?

The gradient precision is determined by the x-axis and y-axis precisions. The one with the lowest precision (no. of significant figures) determines the precision for the gradient.

What is fractional uncertainty?

What is fractional uncertainty?

When the uncertainty is given as a fraction of the measurement.
e.g. 7.0 ± 3/35 % V

How should uncertainty be expressed in a table of results?

How should uncertainty be expressed in a table of results?

The absolute uncertainty should be stated beside every value of the table.

For values that aren't an average, the absolute uncertainty should be the same for the same time of measurement.

How should you work out the uncertainty of a value derived from the addition or subtraction of data?

How should you work out the uncertainty of a value derived from the addition or subtraction of data?

For addition and subtraction:

absolute uncertainty = sum of absolute uncertainties

How should you work out the uncertainty of a value derived from the multiplication or division of data?

How should you work out the uncertainty of a value derived from the multiplication or division of data?

For multiplication and division:

percentage uncertainty = sum of percentage uncertainties.

How should you work out the uncertainty of a value derived from raising data to a positive power?

How should you work out the uncertainty of a value derived from raising data to a positive power?

For raising to a positive power:

percentage uncertainty = percentage uncertainty x the power

How would you estimate the absolute uncertainty in a gradient?

How would you estimate the absolute uncertainty in a gradient?

1. Draw a worst acceptable straight line.

2. absolute uncertainty = gradient of line of best fit – gradient of worst acceptable line.

How would you estimate the absolute uncertainty in a y-intercept?

How would you estimate the absolute uncertainty in a y-intercept?

1. Draw a worst acceptable straight line.

2. absolute uncertainty = y-intercept of line of best fit – y-intercept of worst acceptable line.