**PSMT Report Structure Scaffold**

**It’s a checklist**, so tick each item off when you are sure that you have included it in your report!

The purpose of this document is twofold:

* It provides you with detailed information on what should be included in each section of your report.
* It also provides **feedback for your draft**. **You** need to proofread your draft, and check that you have included each item mentioned in this list. If not, please keep working!

If you require **individual feedback** on your draft, please speak with your teacher to **organise a time** for this. This could occur in circumstances such as:

* you are unsure of how to include something from this checklist in your report
* you would like confirmation that what you have included meets the required standard, etc

**Please do not stop working on your report, while waiting for feedback! Stop when your report is finished!**

Style Guide:

* Use the headings in **bold** below, for your report.
* Report should use (formal) everyday written and mathematical language, in the third person: *do not* use personal pronouns, such as I and we.

**Introduction** The introduction describes what the task is about and *briefly* outlines how the writer intends to complete the task. It consists of statements and/or brief descriptions, *not* explanations of any methods etc. (Suggested length = 1 - 2 paragraphs)

* Discuss the context of your investigation/report: what are you attempting to do - what is the task/question being answered/problem being solved?
* State the steps/processes involved in ***formulating*** the problem: what processes did you need to use to turn the real world problem into a mathematical problem – did you need to collect or generate data required to solve the problem? If so, how did you do this?
* State the key rules/procedures used to ***solve*** the problem: What models are you using, and how will they be developed? *Briefly* mention by name, or write formula only, but *do not* show any working/calculations.
* State that your report will involve ***evaluating/verifying*** and ***refining*** your model, and state how this will be done: by drawing conclusions, discussing the **key results** and the **strengths** and **limitations** of the model/solution/s.
* State that your report will include justification and/or recommendations, related to the context of the initial problem.

**Method** (suggested length = 1 paragraph)

* Describe the method/processes involved in ***formulating*** the problem - describe how you obtained the data to be used in your calculations. Show any working used here.
* Include screen shots/images to help explain your method/process (where appropriate).
* Include a data table, with a caption describing what the data table shows. Note: captions are placed *above* tables.
* Did you make any assumptions while obtaining your data? If so, discuss them here.

**Analysis**

* Explain how you ***solved*** the problem - how did you develop your initial 2 models (first turning point model, and first factorised model).
* Show each step of your mathematical working (like you would in your maths notebook: sub in values, rearrange, etc…)
* Justify your working/procedure, by explaining (in words) your mathematical reasoning - what did you do, and why? For example, state which model/s you used, and justify why you choose them. Also justify and/or explain the key procedures/steps in your working – why did you need to do them?

Justify = give reasons or evidence to support an answer, response or conclusion; show or prove how a statement or conclusion is right or reasonable

* If you made any assumptions in your working, be sure to discuss them.
* Briefly evaluate the reasonableness of your initial models (your solution), by discussing strengths and limitations:
  + Do they visually appear a good fit - why/why not? Where does your model fit the logo curve well (strengths)? Where does it deviate from the logo (limitations)? Include and *refer to* screenshots/ images/data values/co-ordinates etc, to help.
  + Discuss the total residual for each model: what does it tell you about the accuracy (fit) of the model? Which of the two models is best?
  + Make a decision (state this) – are the models good enough, or do they have too many limitations, and therefore you should keep trying to improve them?

**Refining the Models** (This section is essentially a repeat of what you did in the Analysis section, except you are discussing your modification of the existing models, rather than how you developed the initial ones – the mathematical working however will be the same.)

* Modify your initial two models (turning point and factorised forms).
* Show all mathematical working.
* Justify your changes, by explaining why you made the mathematical changes that you did. Note any patterns that occur, as you make a change. (Eg: Moving points closer together made the model…)
* Evaluate your refined models: compare them visually (do they look like a better/worse fit?), and by comparing total residuals (include data, images, etc to help with your evaluation)
* Discuss strength and limitations of your new models (aim for at least 3 to 4)
* Clearly state which type of model (factorised or turning point) is better overall, and how you know this (refer to previous 2 dot points - justify your decision)
* Clearly state which is the best of your 4 models (justify this decision – visual fit, and also residuals)
* Repeat the steps above, to generate a final, best, model. Clearly state this model and its residual.

**Conclusion**

* Justify your choice of this as the best model – visually and by comparing residuals.
* Your decision about which is the best model must also involve an evaluation the reasonableness of this model – do you think it fits the logo well enough to be useable/practical? Could it be used to produce a workable, recognisable logo? For example, if it doesn’t pass through the required turning point, or *x* intercepts, would it still look enough like a McDonalds M to be used?
* Are your assumptions reasonable? Do/could they significantly reduce the accuracy/reliability of the model?
* Discuss any other strengths and limitations of the model, for example: does the symmetry of the model work well with an asymmetrical image? Is the model easy/practical to use – simple to develop, simple to calculate required points to produce a graph/image? Could it be used for a different size logo, without significant adjustment?
* Make recommendations:
  + How could the model be improved? Would a different model be more appropriate/why?
  + Is there any way to avoid making the assumptions you had to?
  + Could anything in your method be changed/improved?
  + Was your method, and use of technology (Excel, Desmos) helpful/efficient? Could anything be improved?