

IB SL MATHEMATICS PROJECT 1

INVESTIGATING FUNCTIONS

PROJECT OBJECTIVE: INVESTIGATE THE TRANSFORMATION OF PARENT FUNCTIONS.

Investigate the transformation of a function of your choice. Once you have identified the function, all areas of how the graph is reflected, translated, shifted, stretched etc.. must be explained and examined.

This project is due on Friday Feb 14th 2014. You will be graded on the following categories:

- Presentation – Project must be in a file jacket, with a content page and bibliography if needed. Project must be typed. All graphs must be done using technology.
- Use of Technology – Creativity with computer usage.
- Content – How well project is developed and explained.
- Analysis – How project is analysed.
- Communication – How the project flows. Is it an easy read?

The investigation below was given as an IA a few years ago. Use as a reference and expand on overall investigation.

Enjoy!

IB MATHEMATICS EXPLORATION GUIDELINES

- **Cover Page**

Your cover page should have your name, IB Number and the title of exploration. A picture is optional.

- **Introduction**

Your introduction is the first page the IB coordinator and teacher sees. The opening of the exploration is very similar to the opening of an essay. GET MY ATTENTION! The opening could be a story, a few facts about the topic, or a life experience. Once you have captured my attention. The rest of the introduction should be as follows:

- A clear statement of task (Thesis)
- Detailed description of how the exploration was conducted.

Introduction should be no more than one page. However, a statistical exploration may need more space to explain how data was collected, how sample was chosen etc...

- **Parameters of Exploration**

This section is optional. Some explorations may require preliminary information. Some words may be too long to write over and over again in the body of the document so you may want to use this page to assign abbreviations, clarify terms, or even give clarification to notations used in the document.

This section is defining all unfamiliar terms or mathematical parameters specific to your exploration.

- **Body of Exploration**

This section is where all the meat is. The flow and organization of this section is most important. All tables, graphs, charts or pictures should be clearly labeled, introduced and assessed. Calculations should be typed and ALL work shown.

- **Note: All graphs and tables must be introduced, explained and labeled correctly.**

- **Conclusion / Analysis**

This section is also very important. After you have completed the body of the exploration it is now time to wrap up. This should be a recap of all important points mentioned in body as well as a clear acceptance or rejection of your statement of task. Remember you are always trying to prove or disprove your thesis. All evidence in the body of this exploration should be supporting, explaining, clarifying or disproving your statement of task.

Along with the conclusion, you should also write a clear analysis of exploration. This should include areas that could have been more clear, mistakes that were made during the process, predictions, or recommendations. Be your own critic.

- **Bibliography**

If any outside sources were used please cite them.

1 Investigating the Quadratic Function

Type I

Work done on this assignment will be assessed against all six criteria A, B, C, D, E and F. You are therefore expected to use a graphic display calculator and/or computer for this assignment.

1 Sketch the graphs of

(a) $y = x^2$

(b) $y = x^2 + 3$

(c) $y = x^2 - 2$.

What do you notice? Can you generalize?

2 Consider the graphs of

(a) $y = x^2$

(b) $y = (x - 2)^2$

(c) $y = (x + 3)^2$.

What do you notice? Can you generalize?

3 Where would you expect the vertex on the graph of $y = (x - 4)^2 + 5$ to be? Explain why.

4 (a) Express $x^2 - 10x + 25$ in the form $(x - h)^2$.

(b) Express $x^2 - 10x + 32$ in the form $(x - h)^2 + g$.

(c) Repeat this procedure with some examples of your own.

(d) Describe a method of writing the quadratic expression $x^2 + bx + c$ in the form $(x - h)^2 + g$.

5 Describe the shape and position of the graph of $y = (x - h)^2 + g$. Provide an explanation for this.

6 Do your findings apply to the graphs of other types of functions? Can you generalize?