

2022 Mathematics Specialist 12: Investigation 1

Take-home part (Main syllabus points 3.2.4-3.2.5, 3.2.8)

Investigate the ways in which the graph of a function $y = f(x)$ can intersect with the graph of its inverse function $y = f^{-1}(x)$.

You should consider the following questions:

- What algebraic techniques can be used to find points where $y = f(x)$ and $y = f^{-1}(x)$ intersect?
- Can there be infinitely many intersection points? Or none at all?
- Are there ways of determining the number or type of intersection points without actually finding them all?

You are encouraged to explore these questions for a variety of different types of functions (such as linear, quadratic, rational etc.)

In the validation test you will be allowed two A4 pages with notes on both sides and a scientific calculator, but NO ClassPad. A formula sheet will be provided.