$$(x-1)(x-3) = 0$$
$$x = 1, 3$$

ALGEBRA

MATHS   **LEVEL 2**

The algebra standard takes a lot of concepts you will have learnt about in previous years - such as rearranging and solving equations - and builds on them with new concepts such as logarithms, exponents, and the discriminant. Think of each new algebraic skill you learn as a tool in your maths arsenal - and make sure you understand what you are doing, and why you are doing it, before tackling each next concept.

OVERVIEW OF THE STANDARD

- Expanding and factorising equations

- Algebraic fractions

- Exponents and logarithms

- Quadratics and polynomials

STRUCTURE OF THE EXAM

Warning: this section is to help you focus your time/study. Our analysis is based off previous year's exams and is no substitute for understanding the concepts. NCEA can change the exam format without much notice, so the best strategy is to be prepared for anything!

The exam is likely to be broken into 3 questions - each consisting of a mix of questions from the above sections. Expect to see straightforward questions, and questions asking you to apply knowledge to a more complex context. Because the types of questions you are asked can vary, it is crucial that you refer to the form or unit the examiner wants you to give your answer in.

CONCEPTS AND SKILLS TO FOCUS ON

Although every aspect of the exam is equally important, here are some key concepts to focus your study on:

Depreciation questions:

Questions regarding the depreciation of a product are a very common way of testing your knowledge of exponents - and are therefore very examinable! They also test your ability to rearrange equations and understand contextual information in relation to the real world. Make sure to give your answer in the form asked for in the question, and be careful when rearranging and substituting numbers, so that you don't lose marks unnecessarily!

STUDY TIME

Calculating the discriminant:

The discriminant formula is one of the most important equations you will be using in level 2, and beyond! Make sure you understand how to use the formula, and what it means in relation to the question. It is also important that you understand how to relate the discriminant value to the number of real solutions found in a graph.

Understanding logarithms:

Logarithms are another new concept in level 2 maths - and another idea students have trouble getting their head around. Solving and writing out logarithms can take a while to get used to - but the best way to get more confident is definitely through practice! There are guaranteed to be a few logarithm questions each year, so time spent practicing these is definitely worthwhile!

COMMON MISTAKES:

From the NCEA gods themselves:

Not factorising in order to simplify equations:

In level one, simplifying an equation meant expanding equations and collecting like terms. In level two, there are a number of different ways to simplify equations - and, although it may seem counterintuitive, factorising is often key to this. Although it is easy to think of factorising as complicated, it is important to start think of collecting common factors as an important way of making equations more simple.

Not being able to convert between logarithmic and index forms:

Lots of people learn how to simplify and write terms in logarithmic form, but miss out on the link between logarithmic and index forms. Remember that logarithms are closely linked to exponential terms, and it pays to be able to convert between them.

Not backing yourself:

It seems crazy, but every year, NCEA examiners mark papers where a student has calculated the correct answer - but has ended up crossing it out, leaving the examiner unable to mark it. Other common mistakes include 'undoing' a correct answer trying to over-simplify a value that is already in its final form. In the exam, it is easy to start doubting yourself and wonder whether you have done everything wrong. In these circumstances, make sure you pause and take a break from the question - and only go back and cross it out if you are sure you did something incorrect.

Not giving the answer in the correct form:

The exam will ask you a number of different types of questions. Some will simply ask for a number, whilst others will ask for a more contextual answer, such as an area or a monetary value. Every time you give an answer, have a quick read back over the question to make sure you are actually answering it.

OVERALL STUDY AND EXAM STRATEGY:

The algebra exam typically has a lot of questions to it, and covers a lot of different topics. Instead of seeing this as intimidating, try and envision it as giving plenty of opportunities to gain marks. In the longer questions, make sure to answer as much as you can, and show your marking as you go. Even if you can't answer all of the excellence questions, there are plenty of ways to pick up achieved and merit marks along the way!