THE RIVERS SECONDARY COLLEGE

The heart of secondary education for Lismore

Assessment Task Notification

[redacted]

Task Number	3	**Task Name**	Investigating Parabolas
Course	Year 10 Mathematics	**Faculty**	Mathematics
Teacher	Mrs Tyson, Mr Whitehall, Mrs Wilford, Mrs Presland, Ms Humphrys	**Head Teacher**	Ms Humphrys
Issue date	Monday 11/8/2025	**Due date**	Friday 5/9/2025
Focus (Topic)	Investigating Parabolas	**Task Weighting**	25%

Outcomes

MAO-WM-01 develops understanding and fluency in mathematics through exploring and connecting mathematical concepts, choosing and applying mathematical techniques to solve problems, and communicating their thinking and reasoning coherently and clearly

MA5-ALG-C-01 simplifies algebraic fractions with numerical denominators and expands algebraic expressions

MA5-NLI-C-01 identifies connections between algebraic and graphical representations of quadratic and exponential relationships in various contexts

MA5-NLI-C-02 identifies and compares features of parabolas and exponential curves in various contexts

Task description

Google Classroom Code: ssyto26

Part A Create a mind map that reflects your knowledge and understanding of parabolas and quadratics. A diagram of a set of parabolas will be provided as a starting point.

10MAT1 to complete the Path Option all other classes to complete the Core Option

Part B Complete an in class test using your Mind Map

Marking Guidelines

Refer to rubric in each part for marking guidelines,

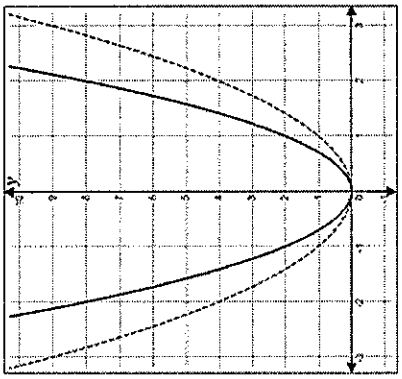
Part A - Create a mind map for the Investigating Parabolas Unit of work

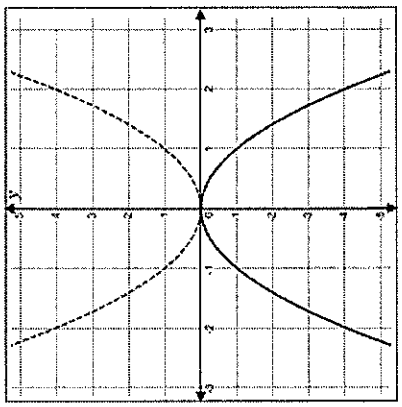
The following is a list of ideas that could be included in your mind map:

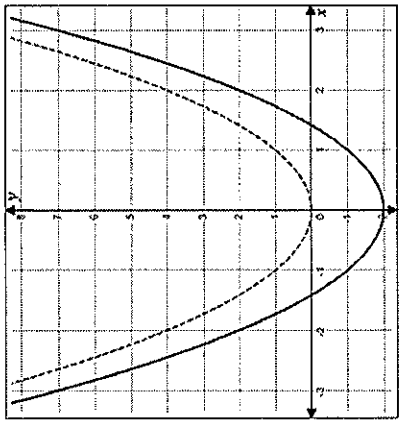
Core

- expanding binomial products
- the relationship between a pattern, table of values, quadratic equation and the graph of a parabola
- identifying the key features of the graph of $y = kx^2$ and $y = kx^2 + c$
  - the shape of a parabola
  - the x- and y- intercepts of a parabola
  - the axis of symmetry of a parabola
  - the vertex of a parabola
- the similarities and differences between a linear equation, an exponential equation and a quadratic equation and their graphs.

Mind Map - Core







Part A - Create a mind map for the Investigating Parabolas Unit of work

The following is a list of ideas that could be included in your mind map:

Core

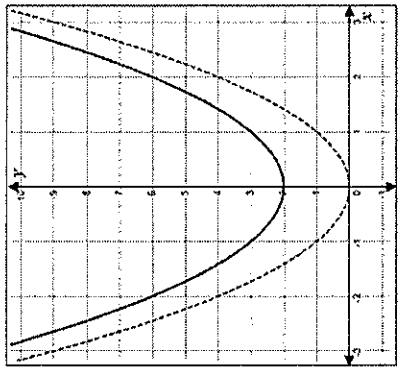
- expanding binomial products
- the relationship between a pattern, table of values, quadratic equation and the graph of a parabola
- identifying the key features of the graph of $y = kx^2$ and $y = kx^2 + c$
  - the shape of a parabola
  - the x- and y- intercepts of a parabola
  - the axis of symmetry of a parabola
  - the vertex of a parabola
- the similarities and differences between a linear equation, an exponential equation and a quadratic equation and their graphs.

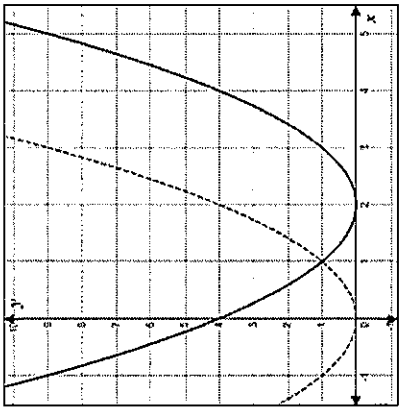
Path

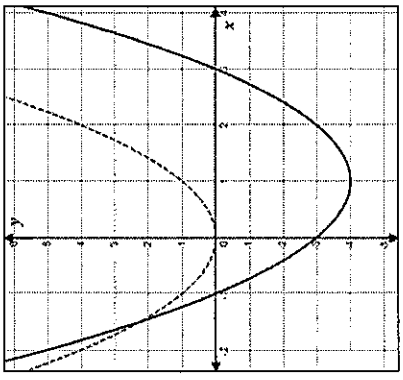
- Perfect squares and the difference of 2 squares
- The effect of the value of k on the shape of the graph of $y = kx^2$ and the graph of $y = kx^2 + c$
- The effect of the values of b and c on the shape and position of the graph of $y = (x - b)^2 + c$
- Factorising monic and non-monic quadratics
- Solve quadratic equations by factorising, completing the square and/or the quadratic formula
- Using 'completing the square' to identify features of different graphs
- The relationship between the quadratic formula and the features of a parabola
- Finding x- and y-intercepts algebraically from a quadratic equation

- Determining the equation of the axis of symmetry and the coordinates of the vertex of a parabola
- Graphing quadratic relationships
- Using the discriminant to identify whether a given quadratic equation has real solutions, and if there are real solutions, determine if they are equal

Mind Map - Path







Marking guidelines - Part A

Criteria	Not demonstrated	Working towards developing	Developing	Developed	Well developed
Representations of parabolas and quadratics	Not demonstrated.	Attempts to annotate or reference the parabolas provided within the task.	Represents a parabola as a table of values, a graph or an equation.	Accurately shows the connection between the graph of a parabola and its equation.	
Features of a parabola	Not demonstrated.	Attempts to identify some features of a parabola, such as the intercepts, the shape of the parabola and the axis of symmetry.	Identifies and explains features of a parabola.	Identifies and explains all features of a parabola and how to find them from the equation.	

Criteria	Not demonstrated	Working towards developing	Developing	Developed	Well developed
Mathematical communication and reasoning	Not demonstrated.	Uses some mathematical language to communicate their reasoning.	Uses precise mathematical language consistently and effectively to communicate reasoning, explain solutions and justify results.		
Application of quadratic relationships (Core)	Attempts to complete the table of values.	Attempts to explain why a parabola would not represent the catenary.	Explains why a parabola would not represent the catenary using the features of a parabola and one representation.	Explains why a parabola would not represent the catenary using the features of a parabola and multiple representations.	
Algebraic techniques (Path content)	Not demonstrated.	Attempts to factorise a quadratic expression.	Successfully factorises a variety of quadratic expressions.	Uses connections between the terms of quadratic expressions and binomial products to strategically approach the problem.	