<div align="center">QUADRATICS AND PARABOLAS</div>

GENERAL INFORMATION

For year levels: 10, 11, 12

Background/Description:

Finding the difference of two squares means subtracting the area of one square from another. As with perfect squares this can be expressed in both factorised and expanded forms.

$$(x - a)(x + a) = x^2 - a^2$$

This activity explores the properties of this family of functions and their graphs, which are parabolas.

This activity covers the following Australian Curriculum - Mathematics Content:

Expand binomial products and factorise monic quadratic expressions using a variety of strategies (ACMNA233)

Explore the connection between algebraic and graphical representations of relations such as simple quadratics … using digital technology as appropriate (ACMNA239)

Solve simple quadratic equations using a range of strategies (ACMNA241)

<div align="center">EXPLORING THE DIFFERENCE OF TWO SQUARES</div>

1) Open the APPLET: Difference of To Squares
2) Read through and follow the instructions on the left side of the page.

   Click on the checkboxes to progressively show more of the applet material

3) Enter a value for **a**.
   Write down the resulting equation. (**Click on the next checkbox)**

4) Explain the effect of changing the value of **a**:

   When **a** is positive _____

   When **a** is negative _____

   Click on the next checkbox
5) Change the value of x by dragging the blue point. What effect does this have on the areas of the squares shown?

Click on the next checkbox. There will be some text and three squares at the bottom of the screen. (Scroll down if you need to.)

6) Draw an example of the square for one value of **a**, say a = 2.
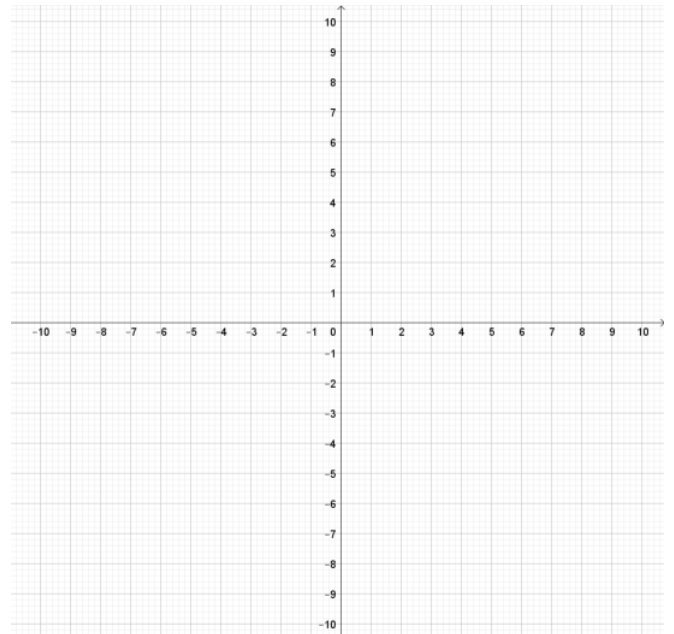
The point on the graph changes colour between black and red

7) When the point is red, what does this tell us about the result of $x^2 - a^2$?

8) Describe the motion of the point as you change the value of x (drag the blue point as before.)

9) Draw the parabola formed by a square of side length $x^2 - 2^2$.

10) Use integer values of **a** between -5 and 5 and describe the effect on the parabola.

11) What does the factor form of a quadratic tell us about the x-intercepts?

12) What does the factor form of a quadratic tell us about the turning point of the parabola that can be drawn from it?

FURTHER INFORMATION