

FENCE THEM IN – Information for the Teacher

Aims: As part of the unit 'Quadratic Functions' students are going to investigate the relationship between area and width of rectangular paddocks for given perimeters.

At the completion of this investigations students will:

1. Find the maximum area for a given perimeter of fencing.
2. Use the graphical calculator to generate lists.
3. Create the graphs of Area versus width.
4. Use Nick Solve program to solve two simultaneous equations to determine the values of a , b and c for the quadratic function $y = ax^2 + bx + c$
5. Use quadratic regression to confirm the found equation.
6. Complete the square to determine the maximum area.
7. Use calculator to confirm maximum area.
8. Investigate the relationships between a , b and c for the given perimeter.

This activity is designed for Year 10 Mathematics as a consolidation of taught concepts in use of quadratic functions. This activity is placed at the end of the quadratic functions unit. The use of the graphical calculator is an integral part in the activity and will involve students using the Statistics function to generate lists and complete quadratic regressions. They will also use the Graphing function of the calculator to confirm the calculated maximum area for a given perimeter.

At Westbourne Grammar School the TI83 calculator is introduced at Year 9 so the students will have the following prerequisite skills:

- Entering data into SATS list
- Creating graphs from lists
- Entering formula to generate related lists
- Substitution into formula

Prior to the commencement of the activity year 10 students will be able to:

- Locate maximum and minimum values
- Recognise the quadratic function $y = ax^2 + bx + c$ general form
- Be aware of simultaneous equations to find unknown pronumerals
- Recognise the quadratic function $y = a(x - h)^2 + k$ for identifying maximum or minimum values
- Complete the square for any quadratic function