

# Student Activity 1a

Tables for each of the functions below are drawn on the next page of this document for  $x \in \{-3, -2, -1, 0, 1, 2, 3\}$ . Fill out all the tables first so that you can decide on a scale which will suit all the functions when plotting a graph. Plot all the graphs **using the same axes and scales** using the grid given on the next page. Verify the shape of each graph by calculating y values of points, in between those plotted, and comparing the answers with the y values of the same points given by your graph.

Polynomial in the form $f(x) = ax^2$ $a \in \mathbb{N}$	State the shape of the graph and whether it opens upwards or downwards	x – intercepts (algebraic method and using the graph)	y – intercept (algebraic method and using the graph)	Maximum/minimum point as an ordered pair and labelled as max or min	Real root(s) of $f(x)=0$	Equation of the axis of symmetry	f (2.7)	Solve $f(x) = 8$	For what x values is $f(x)$ positive i.e. $f(x) > 0$ ?	For what x values is $f(x)$ negative i.e. $f(x) < 0$ ?	For what x values is $f(x)$ increasing?	For what x values is $f(x)$ decreasing?
$y = x^2$												
$y = 2x^2$												
$y = 3x^2$												
$y = \frac{1}{2}x^2$												

1. What is the effect of the coefficient “a” on the graph of the function  $f(x) = ax^2$ ?
2. Which of the above functions has the greatest rate of change of y with respect to x? How can you check this?
3. Which of the above functions has the smallest rate of change of y with respect to x? How can you check this?
4. What point on the graph does the axis of symmetry pass through?

