

Student Activity 2a

Tables for each of the functions below are drawn on the next page of this document. Fill out the tables for each function 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, between those plotted, and comparing the answers with the y values of the same points given by your graph.

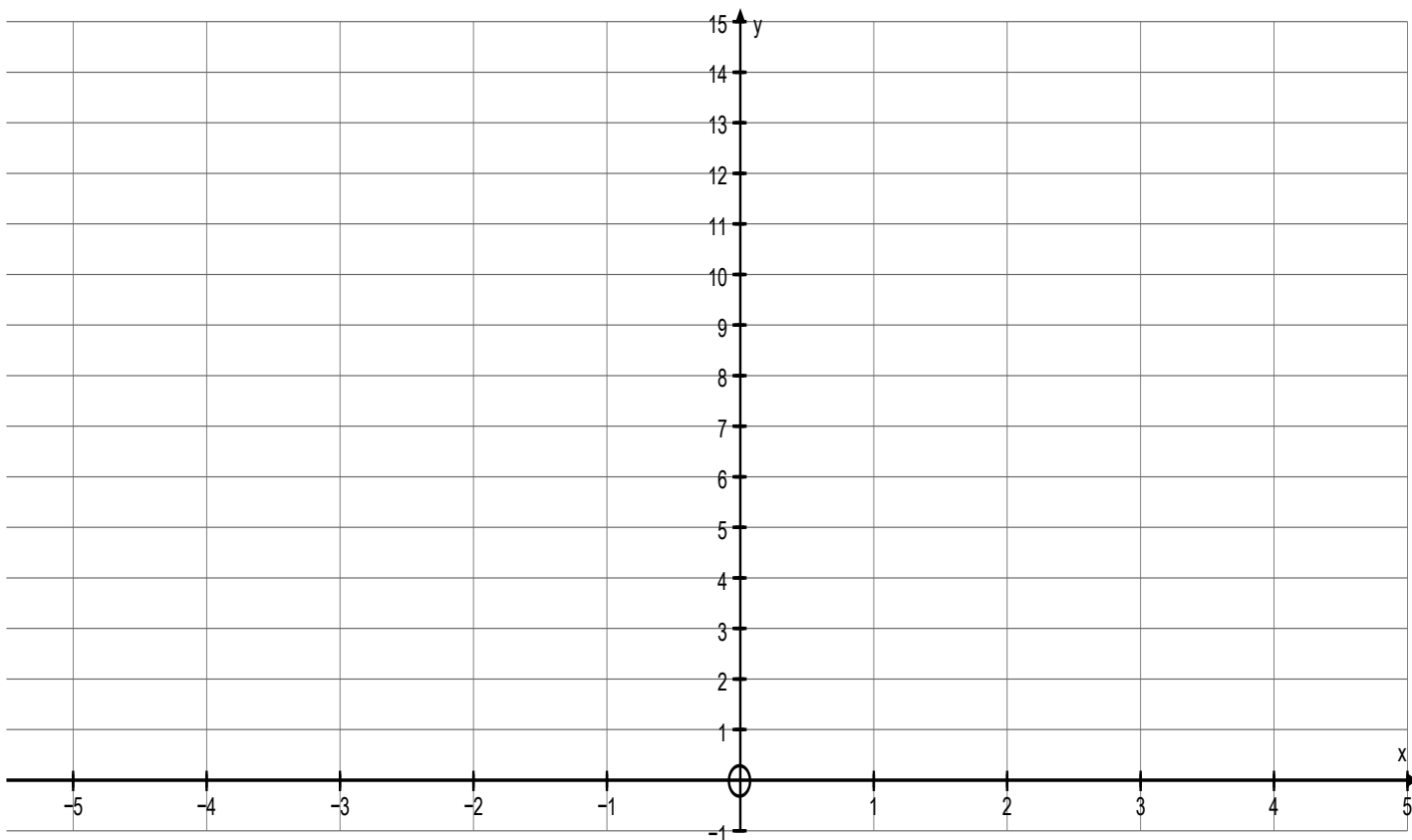
Polynomial in the form $f(x) = (x+h)^2$	State the shape of the graph and whether it opens upwards or downwards	x – intercepts(algebraic method and using the graph)	y – intercept (algebraic method and using the graph)	Maximum/ minimum point as an ordered pair and labelled as max or min	Real root(s) of $f(x)=0$	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?
$f(x) = x^2$												
$y = (x+1)^2$												
$y = (x-1)^2$												

1. If h is positive how does the graph of $y = (x+h)^2$ compare to the graph of $y = x^2$? What transformation of the plane will transform $y = x^2$ onto $y = (x+h)^2$?
2. If h is negative how does the graph of $y = (x+h)^2$ compare to the graph of $y = x^2$? What transformation of the plane will transform $y = x^2$ onto $y = (x+h)^2$?
3. Solve $x^2 = (x+1)^2$ using tables, graphs and algebraically.
4. Solve $x^2 = (x-1)^2$ using tables, graphs and algebraically.

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Draw the graph of $y = x^2$ using a black marker and use different coloured markers to draw the other curves.

Label all the graphs clearly.



x	$y = x^2$	(x, y)
-3		
-2		
-1		
0		
1		
2		
3		
x	$y = (x+1)^2$	(x, y)
-4		
-3		
-2		
-1		
0		
1		
2		
x	$y = (x-1)^2$	(x, y)
-2		
-1		
0		
1		
2		
3		
4		
x		(x, y)

1. Can you write $y = (x+1)^2$ in a different way? Verify using the graph.

2. Can you write $y = (x-1)^2$ in a different way? Verify using the graph.

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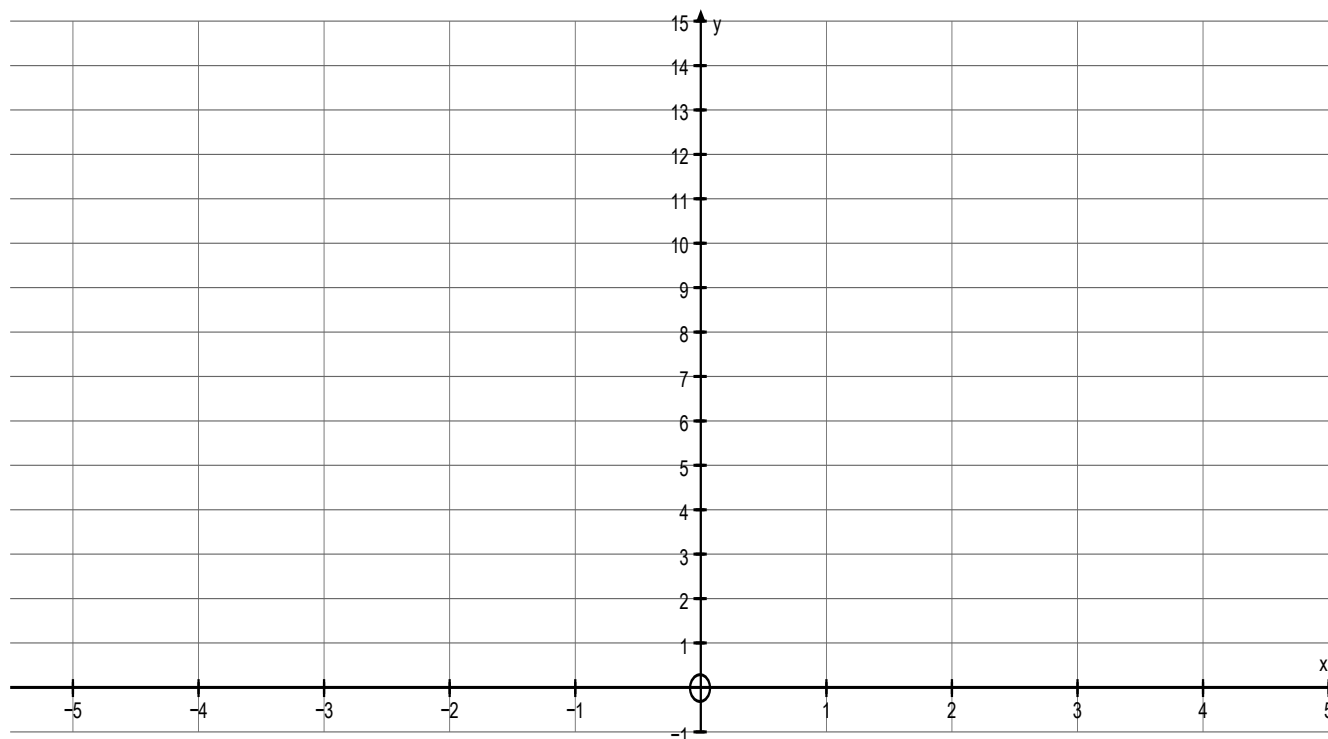
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$y = x^2$												
$y = (x+2)^2$												
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	$y = x^2$	(x, y)
-3		
-2		
-1		
0		
1		
2		
3		
x	$y = (x + 2)^2$	(x, y)
-5		
-4		
-3		
-2		
-1		
0		
1		
x	$y = (x - 2)^2$	(x, y)
-1		
0		
1		
2		
3		
4		
5		

Draw the graph of $y = x^2$ using a black marker and use different coloured markers to draw the other curves.

Label all the graphs clearly.

1. Can you write $y = (x + 2)^2$ in a different way? Verify using the graph.

2. Can you write $y = (x - 2)^2$ in a different way? Verify using the graph.

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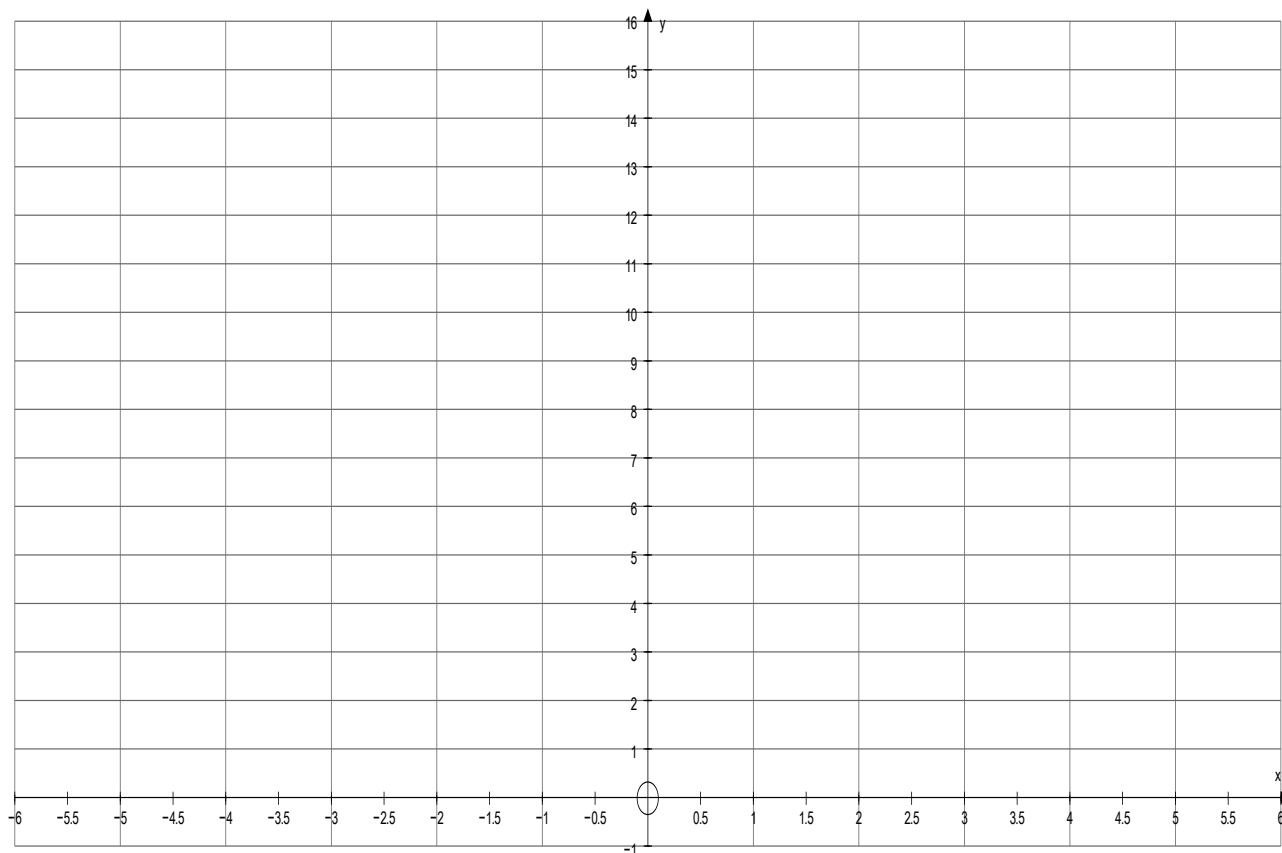
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x	$y = x^2$	(x, y)
-3		
-2		
-1		
0		
1		
2		
3		
x	$y = (x+3)^2$	(x, y)
-6		
-5		
-4		
-3		
-2		
-1		
0		
x	$y = (x-3)^2$	(x, y)
0		
1		
2		
3		
4		
5		
6		
x		(x, y)

Draw the graph of $y = x^2$ using a black marker and use different coloured markers to draw the other curves.

Label all the graphs clearly.



Can you write $y = (x+3)^2$ in a different way? Verify using the graph.

Can you write $y = (x-3)^2$ in a different way? Verify using the graph.