

**A. Lesson Context**

BIG PICTURE of this UNIT:	<ul style="list-style-type: none"> <li>How &amp; why do we build NEW knowledge in Mathematics?</li> <li>What NEW IDEAS &amp; NEW CONCEPTS can we now explore with specific references to QUADRATIC FUNCTIONS?</li> <li>How can we extend our knowledge of FUNCTIONS, given our BASIC understanding of Functions?</li> </ul>		
CONTEXT of this LESSON:	Where we've been  In Lesson 5 DAY 1, you were introduced to <b>the idea of transformations</b>	Where we are  <b>WHY &amp; HOW do we transform parent functions, specifically a quadratic function</b>	Where we are heading  How do we extend our knowledge & skills of quadratic functions, given the new ideas & concepts we now know about functions.

**B. Lesson Objectives**

- Review KEY IDEAS in our parent function,  $y = x^2$
- Investigate the role of the parameters ***h*** and ***k*** in the equation  $y = a(x - h)^2 + k$  and relate that role to the concept of TRANSFORMATIONS
- Apply the idea of transforming a parent function to further functions

**C. Activity #1**

- go to [student.desmos.com](https://student.desmos.com)
- sign in with your DESMOS account (recommend you sign in with your google account)
- enter class code and submit
- complete Quadratic Transformations – Part I
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**D. Activity #2**

- go to [student.desmos.com](https://student.desmos.com)
- sign in with your DESMOS account (recommend you sign in with your google account)
- enter NEW class code for Part II and submit
- complete Quadratic Transformations – Part II
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**E. Extending the Concepts – Working with Function Notation & Transformations**

Example 1: Working with a Piecewise defined function. A function,  $y = f(x)$  is illustrated on the grid.

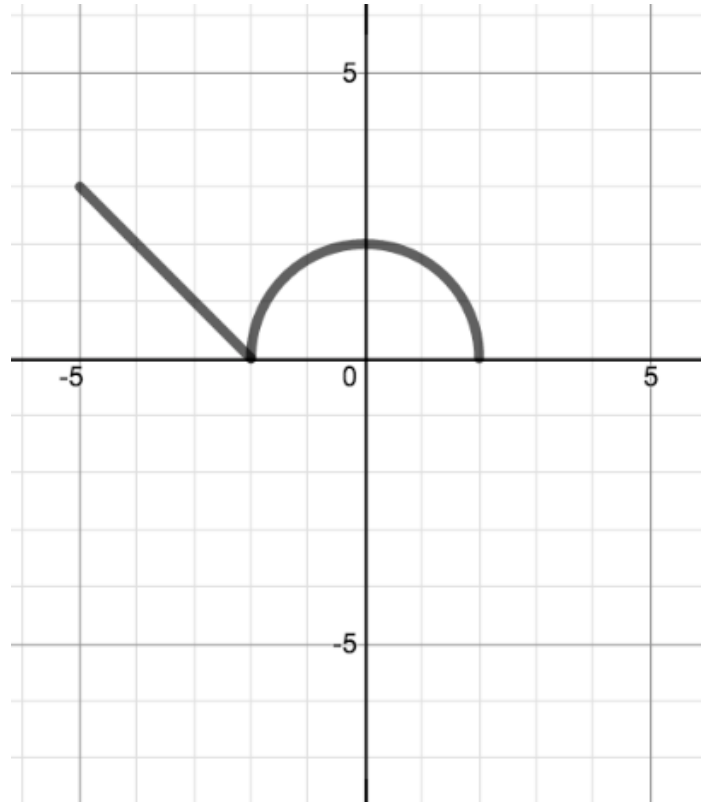
You are required to produce a graph of a new function, called  $g(x)$ , which is a TRANSFORMATION of  $f(x)$  as defined below:

(a)  $g(x) = f(x - 2) - 1$

(b)  $g(x) = 2f(x + 1) - 3$

(c)  $g(x) = 3 - f(x + 2)$

In each sketch, label KEY points very clearly.



Example 5: Now let  $f(x)$  be one of our new parent functions,  $f(x) = \sqrt{x}$ . On the grid provided, sketch:

(a) the parent function, clearly labelling the key points (0,0) and (4,2) and (9,3)

(b)  $y = \sqrt{x + 1} - 5$ , clearly labelling the new locations for the original key points

(c)  $g(x) = -f(x - 3) - 7$ , clearly labelling the new locations for the original key points

