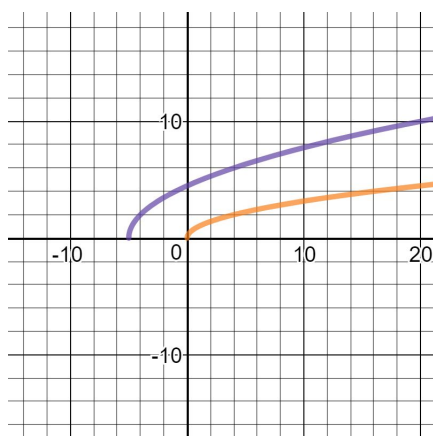


# Mother Function Project

You will be creating a series of graphs in Desmos, importing them into a google doc, and reflecting on the changes after each graph. The final project will be submitted to me both digitally and as a paper document that you have printed and highlighted.

Requirements:

- Each graph will contain **two** functions: the mother function, and the second function.



**“The related function is shifted to the left 5, and is increasing faster than the mother function.”**

- Each of the two graphs in each image should be labelled with its equation, including the mother function, **each time**.
- Each graph will be followed by a sentence or two about what changed from the mother function to the related function.
- When the final document is printed, take a highlighter and highlight the graphs so that the parent function can be differentiated from the second function graphed with it. I recommend keeping the mother function one color from graph to graph. (If you have a color printer at home, that’s fine too.)
- When all the functions have been graphed, complete **p. 547 #8-23 AT THE END OF YOUR GOOGLE DOC WITHOUT USING THE DESMOS GRAPHING TOOL**. It should be appended to the end of your mother function google doc. This is part of your project.
- Answer the following questions after your answers to P. 547:

- What happens to a mother function when you add or subtract a number on the end (not under a radical)?
- What happens to a mother function when you multiply it's first term ( $x^2$ , or  $\sqrt{x}$ , or  $x$ , or  $b$ ) by a whole, positive number?
- What happens to a mother function when you multiply its first term by a negative number?
- What happens to a mother function when you multiply its first term by a fraction?

Functions:

Linear mother function:  $y=x$

- $y=2x$
- $y=x+4$
- $y=-x$

Quadratic mother function:  $y=x^2$

- $y=x^2+3$
- $y=x^2-4$
- $y=\frac{1}{2}x^2$
- $y=3x^2$
- $y=-x^2$
- $y=-3x^2$

Square Root mother function:  $y = \sqrt{x}$

- $y = 3\sqrt{x}$
- $y = -\sqrt{x}$
- $y = \sqrt{x+6}$
- $y = \sqrt{x-4}$
- $y = \sqrt{x} + 2$
- $y = \frac{1}{4}\sqrt{x}$

Exponential functions:  $y=ab^x$  (we will use  $y=2^x$  as our mother function)

- $y=2(2^x)$
- $y = \frac{1}{6}(2^x)$
- $y=-2(2^x)$
- $y=2^x-5$
- $y=2^x+4$