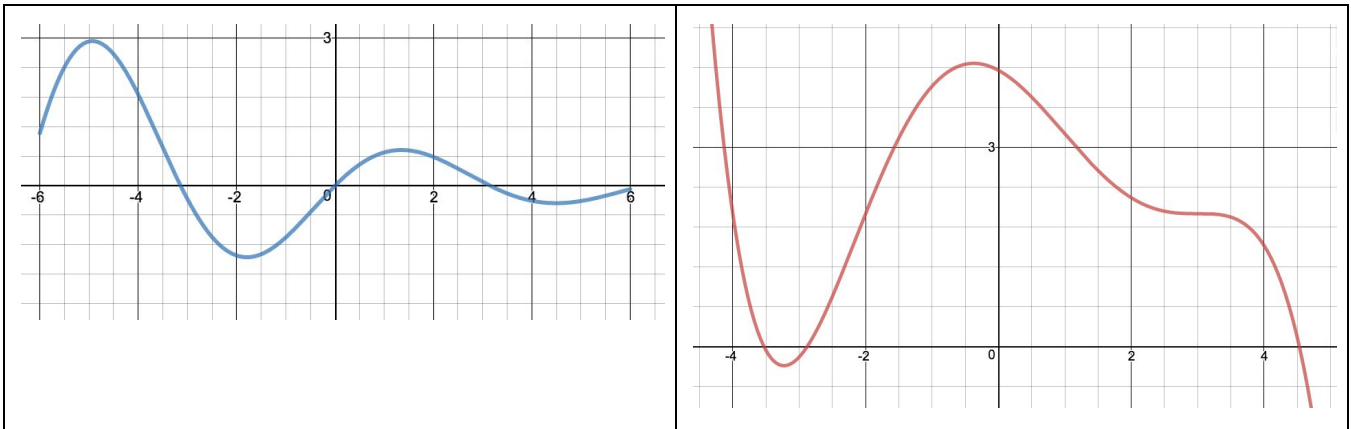


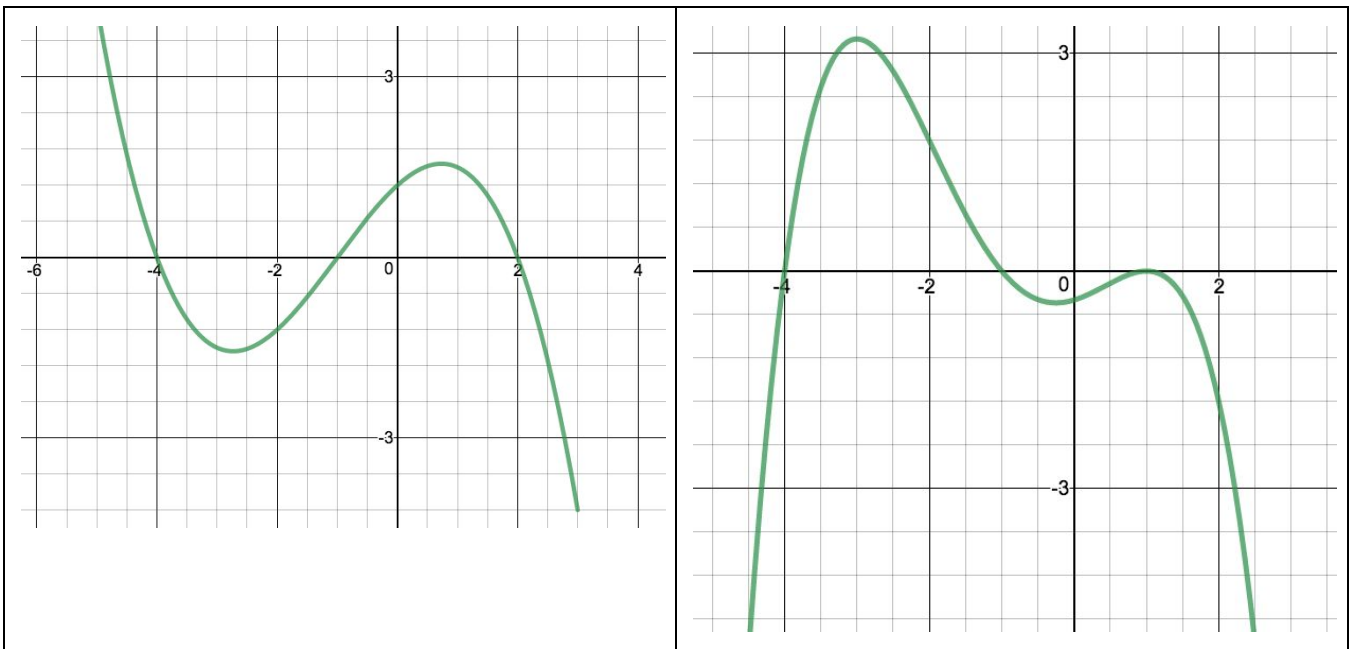
Math SL EXPLORATION LAB 7

In this assignment, you will investigate the **First Derivative Test** as one application of derivatives, wherein we use the first derivative to determine (i) whether a function is increasing or decreasing and hence (ii) use this information to classify the extremas of a function as either maximums, minimums or neither. This entire lab is Calc Inactive!!

Part A - Sketch a graph of the derivative function, given the graph of the original function



Part B - Sketch a graph of a function, given the graph of its derivative function.



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Part C - Matching exercise: Given a collection of graph of functions and their derivatives, match the appropriate pairings of graphs of function & its correct derivative

(1) Work with the paper copies and handouts and prepare a list \Rightarrow column 1 lists the function and column 2 lists the matching derivative

(2) http://mrsantowski.tripod.com/2017MathSL/Labs/matching_fcn_firstder.pdf

Part D - ALGEBRAIC Calculus based analysis: Given an equation, find its derivative, its zeroes and hence find the intervals of increase and decrease of the original function.

(i) $f(x) = x^3 - 3x + 1$

(ii) $g(x) = x^4 - 4x^3 - 8x^2 - 1$

(iii) $h(x) = 3x^4 - 16x^3 + 18x^2 + 2$

Part E - ALGEBRAIC Calculus based analysis: Given a derivative, find its zeroes and where the derivative is positive/negative and hence determine the intervals of increase/decrease and classify the extrema of the original function

(i) $f'(x) = (x - 2)(x + 4)$

(ii) $g'(x) = x^3 - x^2 - 2x$

(iii) $h'(x) = (x - 3) \sin(x)$ on $[-\pi < x < 2\pi]$