Rates of change: Follow up to first and second differences activity Date: _____

1. Consider scenarios (Ferris wheel, and cubic). Notice that the first and second differences are consistently positive or consistently negative over different intervals of x.

What is happening in the original graph when:

a) the first differences are positive?

b) the first differences are negative?

c) the first differences change from positive to negative?

d) the first differences change from negative to positive?

e) the second differences are positive?

f) the second differences are negative?

g) the second differences change from positive to negative?

h) the second differences change from negative to positive?

2. Consider the graphs of the first differences as you answer each of the following.

a) Over the interval where the second differences are positive, what can you say about the graph of the first differences?

b) Over the interval where the second differences are negative, what can you say about the graph of the first differences?

c) When the second differences change from positive to negative, what can you say about the graph of the first differences?

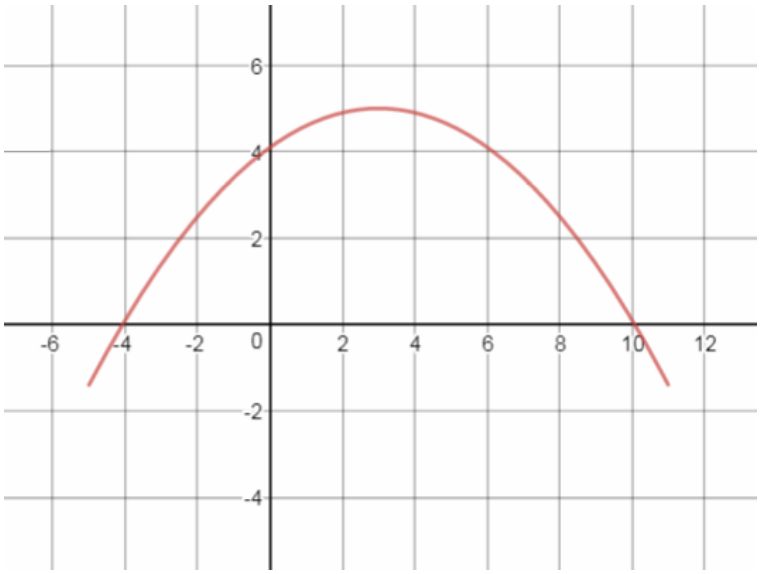
d) When the second differences change from negative to positive, what can you say about the graph of the first differences?

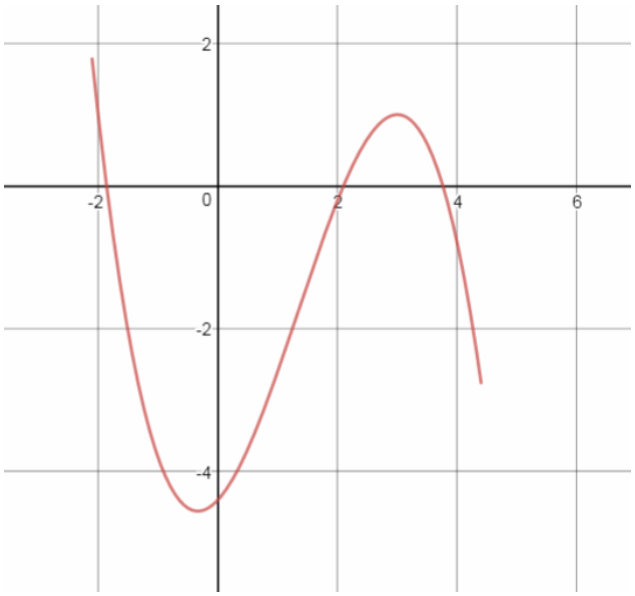
3. Complete the following table as a summary of your findings.

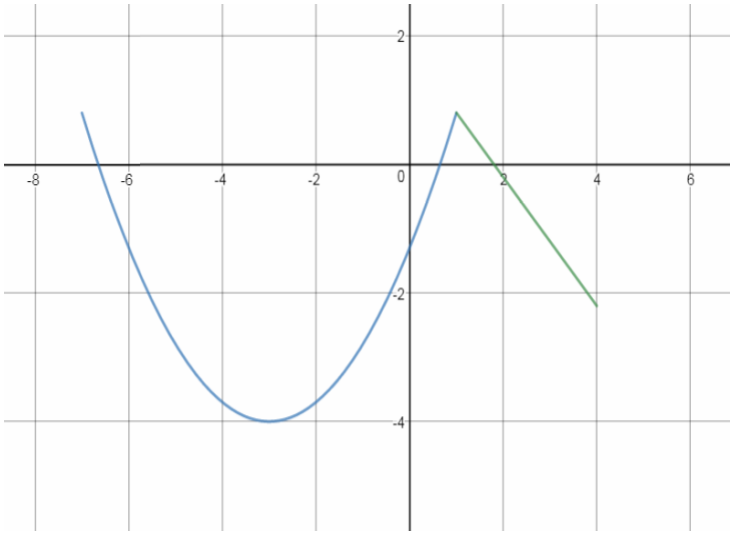
Original Graph	Average rate of change graph	Average rate of change graph of the average rate of change
Positive		
Zero		
Negative		
Increasing		
Turning point		
Decreasing		
Concave Up		
Inflection Point		
Concave Down		

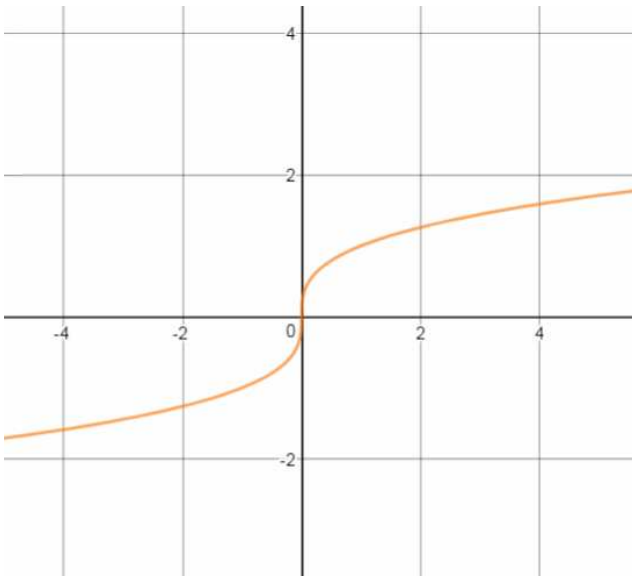
Practice:

For each graph, sketch a graph for the first and second differences. Do not worry about scale, focus on alligning key characterisitics.









Each of the following is a graph of the first differences. Sketch a graph that could be the original graph.