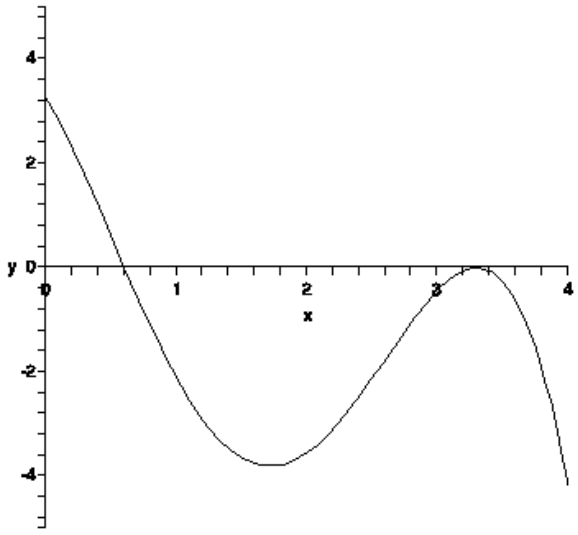
Antiderivatives – Graphical/Numerical

What is the First Fundamental Theorem of Calculus?

Find $\int_1^2 3x^2\,dx$

Below is a graph of a function g defined on the closed interval $[0,4]$.



The following questions are about an antiderivative G. What are the critical points?

What are all the local extrema?

What are all the global extrema?

What are the inflection points?

If $G(0) = 2$, graph G

Suppose $g(x) = 2 - e^{x^2}$ for all real numbers x. The following questions are about an antiderivative G.
What are the critical points?

What are all the local extrema?

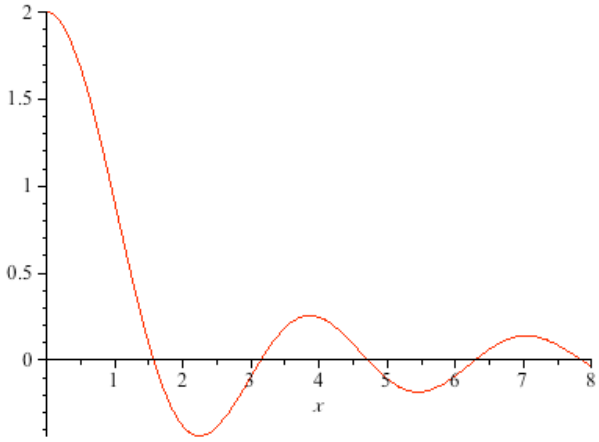
What are all the global extrema?

What are the inflection points?

If $G(0)=2.3$, fill in the following table.

x	$g(x)$	$G(x)$
0.0		
0.3		
0.6		
1.0		

EX1. Suppose f is given by the graph and F is an antiderivative of f satisfying $F(0) = 0$.



At what values of x do the local maximum and minimum values of $F(x)$ occur?

At what value of x does $F(x)$ attain its absolute maximum value?

On what intervals is $F(x)$ concave downward?

On the same axes as above, sketch a reasonable looking graph of $F(x)$.

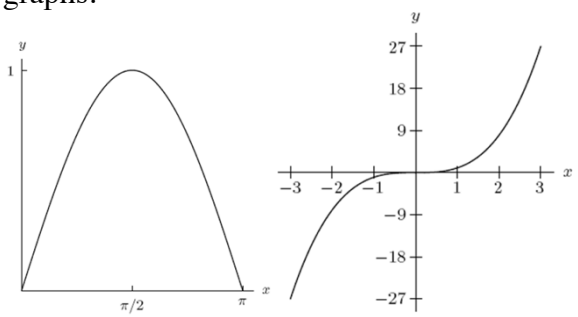
EX2. Suppose F is an antiderivative of $f(x) = \ln(x + 0.6)$ on the closed interval $[0, 3]$ satisfying $F(0) = 7$.
At what values of x do the local maximum and minimum values of $F(x)$ occur?

On what intervals is $F(x)$ concave downward?

Fill in the following table.

x	$f(x)$	$F(x)$
0.0		
0.3		
0.6		
1.0		

EX3. Sketch graphs of antiderivatives for the two functions defined by the following graphs.



The figure below shows a graph of y = f(x) with some areas labeled. Assume F'(x) = f (x) and F(0) = 10. Then F(5) =