**Section 3.1** (Extrema on an Interval)

Examine the graphs below and locate the extrema (maxima and minima) on the given intervals…

 

Intervals: [-2,5], (-2,5), (-1,2), [-1,2] [-2,5], [0,2], (-2,5)

What are the derivatives at these extrema?

A *relative* or *local maximum* (*minimum*) at (c,f(c)) means there is an *open* interval containing c (not an endpoint) on which f(c) is a maximum. How is a relative maximum different that an absolute minimum?

Let f be a function defined at c. If f `(c) = 0 or if f is not differentiable at c, then c is a ***critical number*** of f

Finding extrema of a continuous function f on closed interval [a,b]…

1. Find the critical numbers on (a,b)
2. Evaluate f at each critical number on (a,b) and at endpoints a and b
3. The least is the minimum on the interval, the greatest is the maximum

Example: Find the extrema of y = x3 – 4x2 on the interval [–2,5]

Example: Find the extrema of f(x) = 2x – 3x2/3 on the interval [–1,3]

Example: Find the extrema of f(x) = 2cos(x) + cos(2x) on the interval [0,2π]