

## 4.1 Extreme Values of Functions

1. If a point is a relative (local) minimum, is the point a critical number? Why?

yes. If  $(c, f(c))$  is a rel. min, then  $f'(c) = 0$  or DNE  
so the point is a crit #

2. If a point is a relative (local) maximum, is the point a critical number? Why?

yes. If  $(c, f(c))$  is a rel max, then  $f'(c) = 0$  or DNE  
so the point is a crit #.

3. If a point is an absolute (global) maximum on an interval, is the point a critical number? Why?

maybe b/c abs max could occur at an endpoint

4. If a point is an absolute (global) minimum on an interval, is the point a critical number? Why?

maybe b/c abs min could occur at an endpoint

5. If a point is not a maximum or minimum on an interval, is the point a critical number? Why?

maybe b/c if  $f'(c) = 0$  or DNE, the point is a crit #.

ex:  $f(x) = x^3$   
 $f'(x) = 3x^2$

$3x^2 = 0$   
 $x = 0$

crit #, but not a max/min

6. Graph a function on the interval  $[-2, 5]$  having the given characteristics:

Relative minimum at  $x = 1$

Critical # at  $x = 0$ , but no extrema

Absolute maximum at  $x = 2$

Absolute minimum at  $x = 5$

Sample graph:

