

Ex 1) Find critical numbers.  
Identify relative extrema.

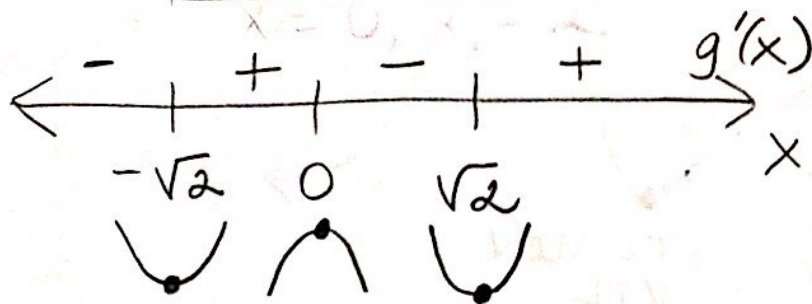
$$g(x) = x^2(x^2 - 4)$$

$$g(x) = x^4 - 4x^2$$

$$g'(x) = 4x^3 - 8x = 0$$

$$4x(x^2 - 2) = 0$$

$$x = 0 \quad x = \pm\sqrt{2} \quad \text{critical values}$$



Rel MAX:  $(0, 0)$

Rel MIN:  $(-\sqrt{2}, -4)$

$(\sqrt{2}, -4)$

check endpoints & rel extrema

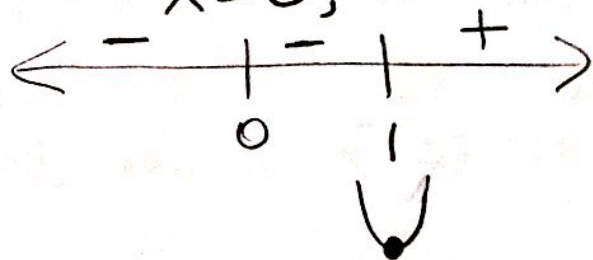
Ex 2) Determine Absolute Extrema.

a)  $f(x) = 3x^4 - 4x^3$  on  $[-1, 2]$

$$f'(x) = 12x^3 - 12x^2 = 0$$

$$12x^2(x-1) = 0$$

$$x = 0, 1$$



$x$	$f(x)$	
-1	7	Abs MIN: $(1, -1)$
1	-1	
2	16	Abs MAX: $(2, 16)$