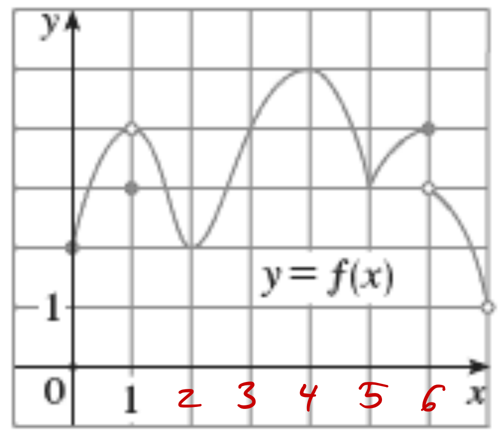
1. From the graph, identify all of the absolute and local maximum and minimum values of the function.

abs. max. @ $x=4$

no abs. min.

loc. max @ $x=4,6$

loc. min. @ $x=1,2,5$



2. Sketch the graph f on the given interval. Use your sketch to find the absolute and local maximum and minimum values of f.

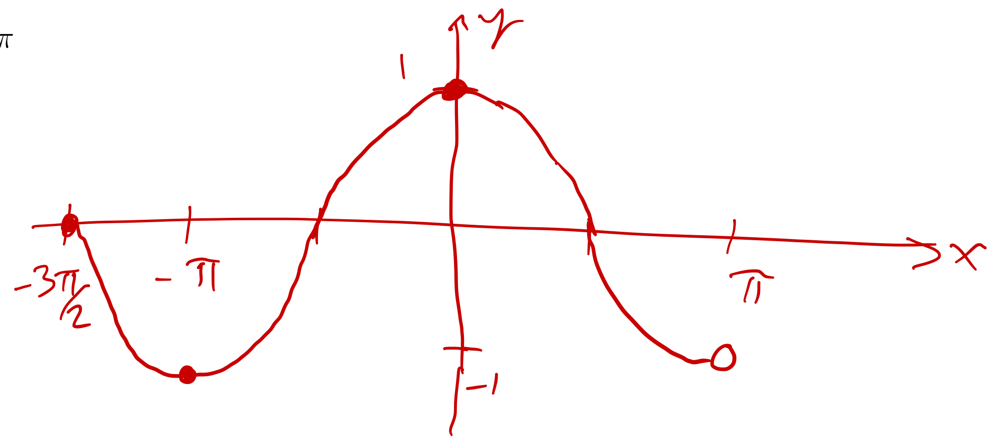
$$f(t) = \cos(t), \quad -\frac{3\pi}{2} \leq t < \pi$$

abs. max. @ $x=0$

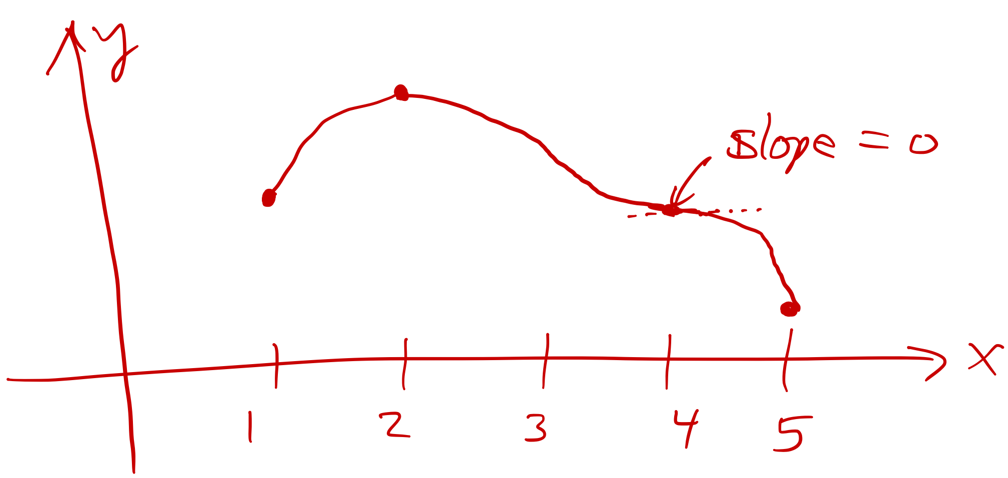
loc. max. @ $x=0$

abs. min. @ $x=-\pi$

loc. min. @ $x=-\pi$



3. Sketch a graph of a function $f(x)$ which is continuous on $[1, 5]$, which has an absolute maximum at $x = 2$, an absolute minimum at $x = 5$, and for which $x = 4$ is a critical number but neither a local maximum nor local minimum.



4. Find the absolute maximum and minimum values of f on the given interval:

$f(x) = 2x^3 - 3x^2 - 12x + 1, \qquad [-2, 3]$

$f'(x) = 6x^2 - 6x - 12 = 0$

$x^2 - x - 2 = 0$

$(x-2)(x+1) = 0$

$x = -1, 2$

x	$f(x)$	
-2	-3	
-1	8	← abs. max
2	-19	← abs. min.
3	-8	

5. Find the absolute maximum and minimum values of f on the given interval:

$f(x) = x^{-2}\ln x, \qquad [\tfrac{1}{2}, 4]$

$f'(x) = -2x^{-3}\ln x + x^{-2}\cdot\frac{1}{x}$

$= \frac{-2\ln x + 1}{x^3} = 0$

$-2\ln x + 1 = 0$

$\ln x = \frac{1}{2} \to x = e^{1/2}$

	x	$f(x)$
abs. min. →	$\frac{1}{2}$	$4\ln(\frac{1}{2}) = -4\ln 2$
abs. max. →	$e^{1/2}$	$e^{-1}(\frac{1}{2}) = \frac{1}{2e}$
	4	$\frac{\ln 4}{16} = \frac{\ln 2}{8}$

6. Find the critical numbers of the function:

$$h(p) = \frac{p-1}{p^2+4}$$

$$h'(p) = \frac{1\cdot(p^2+4) - (p-1)2p}{(p^2+4)^2} = 0$$

never zero ∴ $h'(p)$ always defined

$p^2 + 4 - 2p^2 + 2p = 0$

$-p^2 + 2p + 4 = 0$

$p^2 - 2p - 4 = 0$

$p = \frac{2 \pm \sqrt{4+16}}{2}$

$= 1 \pm \sqrt{5}$