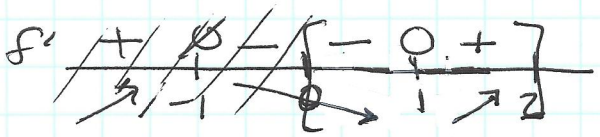
HW DAY 63 §4.2 p. 202–204 # 8, 10, 13, 17, 18

(8) $f(x) = x - 2\ln(x+1)$ on $[0,2]$ → domain restricted $[0,2]$

$$f'(x) = 1 - \frac{2}{x+1}$$

$$\frac{x+1-2}{x+1} = \frac{x-1}{x+1} = 0 \quad \text{und}$$

C.P. $x = -1, x = 1$



$f(1) = 1 - \ln 4 \approx -0.3862$

ABS MINIMUM.

(10) $f(x) = \dfrac{x+1}{x^2+3}$ on $[-1,2]$

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

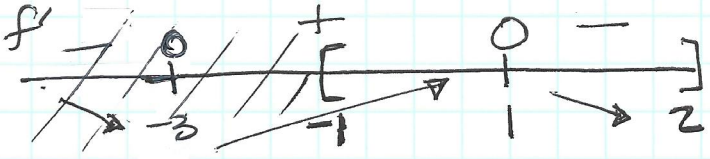
$$= \frac{x^2+3-2x^2-2x}{(x^2+3)^2}$$

$$= \frac{-x^2-2x+3}{(x^2+3)^2}$$

$$= \frac{-(x^2+2x-3)}{(x^2+3)^2}$$

$$= \frac{-(x+3)(x-1)}{(x^2+3)^2} = 0 \quad \text{und}$$

$f'(x) = 0 \quad x = -3, 1$



$f(1) = \frac{1}{2}$ GLOBAL MAXIMUM.

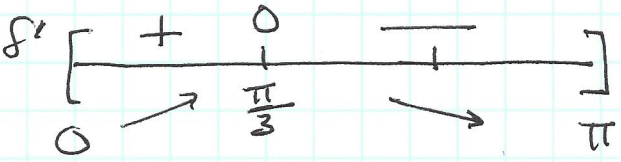
(13) $f(x) = \sin^2 x - \cos x \quad [0, \pi]$

$$f'(x) = 2\sin x \cos x - \sin x$$

$$\sin x (2\cos x - 1) = 0$$

$\sin x = 0 \quad \cos x = \frac{1}{2}$

$x = 0, \pi \quad x = \frac{\pi}{3}$



$f(x)$ has global max $f(\frac{\pi}{3}) = \frac{1}{4}$

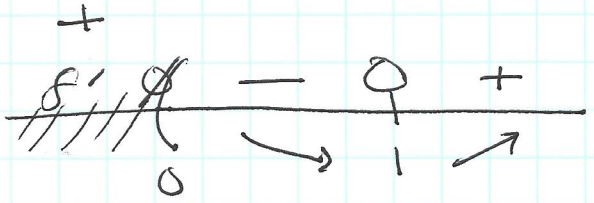
$f(\frac{\pi}{3}) = (\frac{\sqrt{3}}{2})^2 - (\frac{1}{2}) = \frac{3}{4} - \frac{1}{2} = \frac{1}{4}$

HW DAY 63 HW p. 202 # 17, 18
§4.2

(17) $f(x) = x - \ln x \quad x > 0$

$f'(x) = 1 - \frac{1}{x} = \frac{x-1}{x}$

$f'(x) = 0 \quad x = 1$
$f'(x)$ und $x = 0$



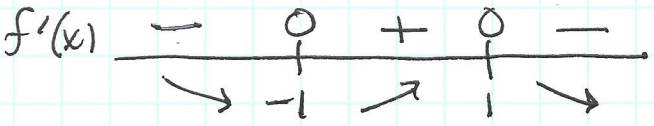
$f(x)$ has global min $f(1) = 1$

(18) $f(x) = \frac{x}{1+x^2}$

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

$= \frac{1+x^2-2x^2}{(1+x^2)^2}$

$= \frac{1-x^2}{(1+x^2)^2} = \frac{(1-x)(1+x)}{(1+x^2)^2}$



$f(-1)$ Relative min $-\frac{1}{2}$

$f(1)$ Relative max $\frac{1}{2}$

NO GLOBAL MAX
NO GLOBAL MIN.