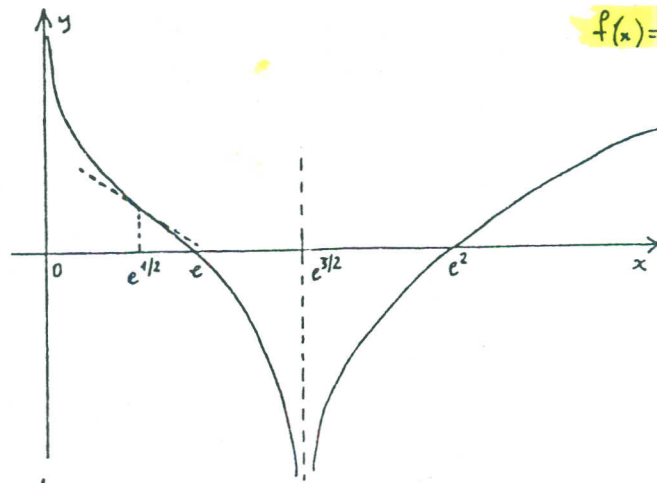


Solutions To practice problems

N.B. on this book log stands for ln!



$$f(x) = \log|3 - 2\log x|$$

$$X =]0, +\infty[- \{e^{3/2}\}$$

$$\nearrow]e^{3/2}, +\infty[$$

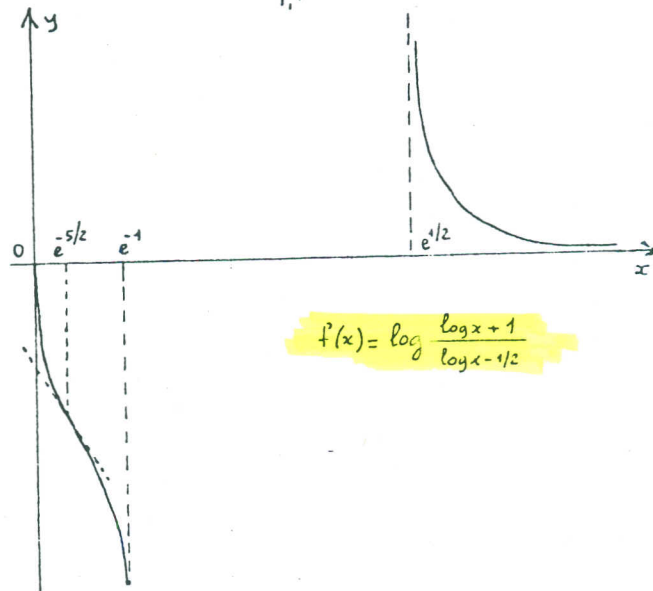
$$\searrow]0, e^{3/2}[$$

$$\cup]0, e^{1/2}] -$$

$$\cap [e^{1/2}, e^{3/2}[,]e^{3/2}, +\infty[$$

$$e^{1/2} = aF^-$$

$$\uparrow x = 0, \downarrow x = e^{3/2}$$



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

$$X =]0, e^{-1}[\cup]e^{1/2}, +\infty[$$

$$\searrow]0, e^{-1}[,]e^{1/2}, +\infty[$$

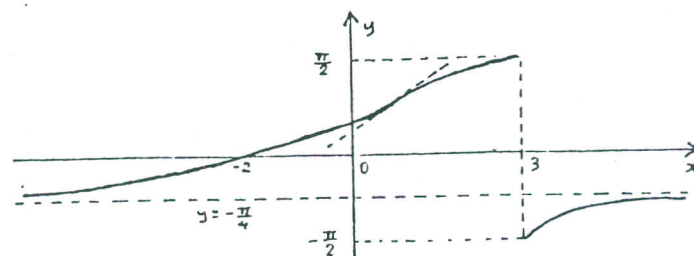
$$\cup]0, e^{-5/2}],]e^{1/2}, +\infty[$$

$$\cap [e^{-5/2}, e^{-1}[$$

$$e^{-5/2} = aF^-$$

$$\overrightarrow{y} = 0, \downarrow x = e^{-1}, \uparrow x = e^{1/2}$$

$$\text{inf} f = -\infty, \text{sup} f = +\infty$$



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

$$X = \mathbb{R} - \{3\}$$

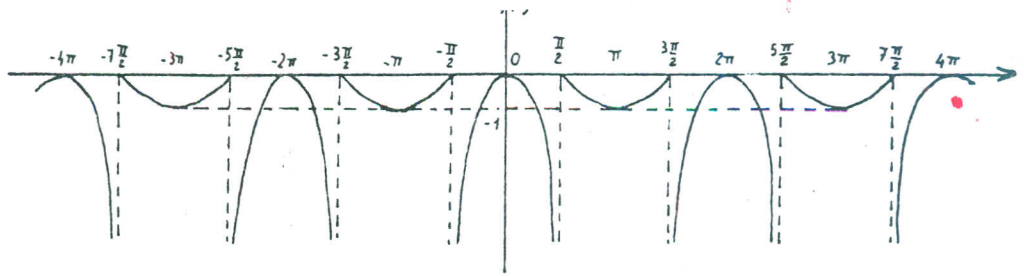
$$\nearrow]-\infty, 3[,]3, +\infty[$$

$$\cup]-\infty, 1/2]$$

$$\cap [1/2, 3[,]3, +\infty[$$

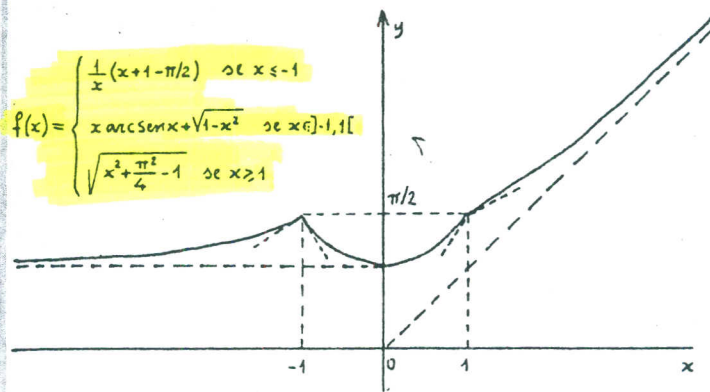
$$1/2 = aF^-, y = -\pi/4$$

$$\text{inf} f = -\frac{\pi}{2}, \text{sup} f = \frac{\pi}{2}$$



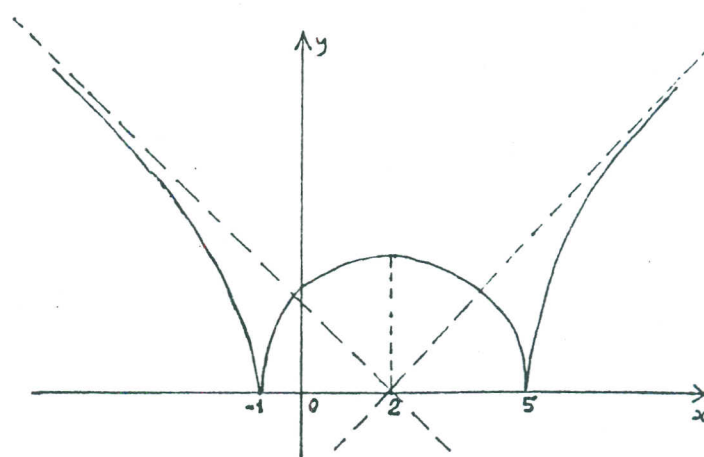
$$f(x) = \begin{cases} \cos x & \text{se } \cos x \leq 0 \\ \log \cos x & \text{se } \cos x > 0 \end{cases}$$

$\nearrow]-\frac{\pi}{2} + 2k\pi, 2k\pi], [\pi + 2k\pi, 3\frac{\pi}{2} + 2k\pi]; \searrow [2k\pi, \frac{\pi}{2} + 2k\pi[, [\frac{\pi}{2} + 2k\pi, \pi + 2k\pi]; k\pi = p\pi, \frac{\pi}{2} + k\pi = p\pi$
 $\cup [\frac{\pi}{2} + 2k\pi, 3\frac{\pi}{2} + 2k\pi], \cap]-\frac{\pi}{2} + 2k\pi, \frac{\pi}{2} + 2k\pi[; \inf f = -\infty, \max f = 0.$



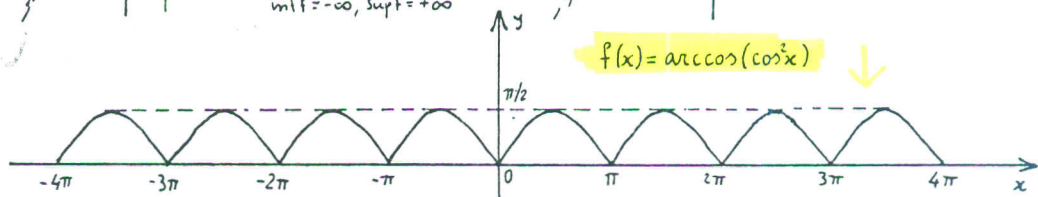
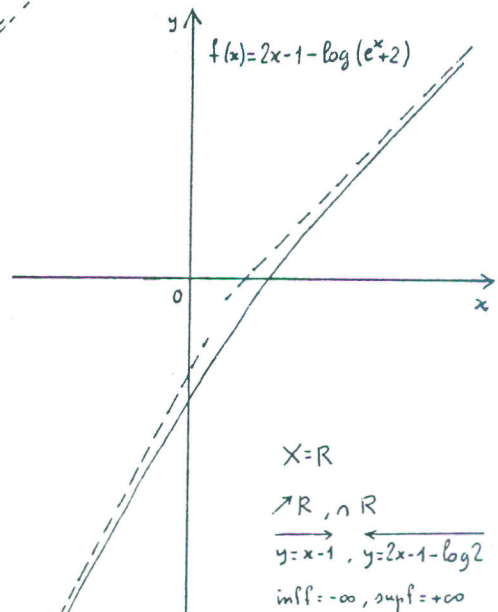
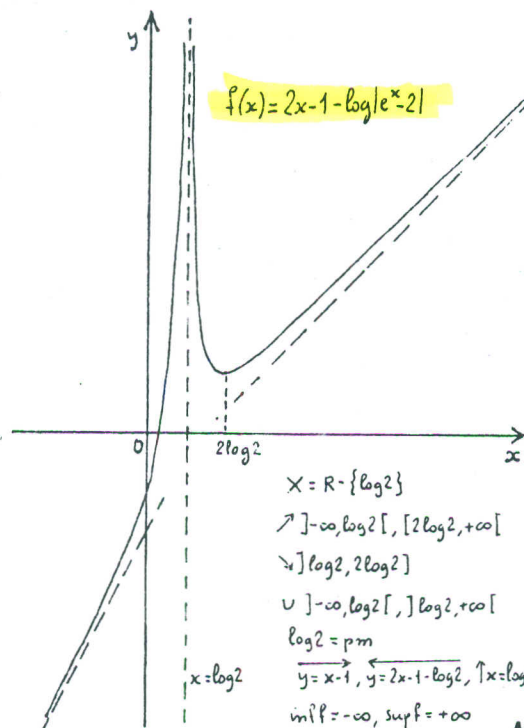
$$f(x) = \begin{cases} \frac{1}{x}(x+1-\pi/2) & \text{se } x \leq -1 \\ x \arcsen x + \sqrt{1-x^2} & \text{se } x \in]-1, 1[\\ \sqrt{x^2 + \frac{\pi^2}{4} - 1} & \text{se } x \geq 1 \end{cases}$$

$\nearrow]-\infty, -1], [0, +\infty[$
 $\searrow]-1, 0[$
 $\cup]-\infty, -1], [-1, 1], [1, +\infty[$
 $\leftarrow y=1, \overrightarrow{y=x}, -1 = pM, 0 = pM$
 $\min f = f(0) = 1, \sup f = +\infty$

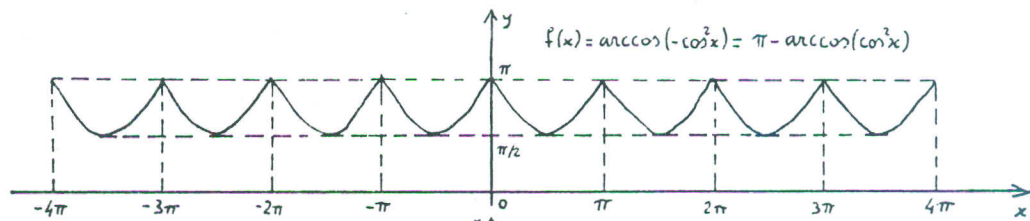


$$f(x) = \sqrt{|x^2 - 4x - 5|}$$

$X = \mathbb{R}$
 $\nearrow]-1, 2], [5, +\infty[, \searrow]-\infty, -1], [2, 5]$
 $\cap]-\infty, -1[,]1, 5[,]5, +\infty[$
 $2 = pM, -1 = pM, 5 = pM$
 $\leftarrow y = -x + 2, \overrightarrow{y = x - 2}$
 $\min f = 0, \sup f = +\infty$
 $f'_-(1) = f'_-(5) = -\infty, f'_+(1) = f'_+(5) = +\infty.$



$\nearrow [k\pi, \frac{\pi}{2} + k\pi], \searrow [\frac{\pi}{2} + k\pi, (k+1)\pi], \cap [k\pi, (k+1)\pi], \frac{\pi}{2} + k\pi = pM, k\pi = pm, \min f = 0, \max f = \frac{\pi}{2}$



$f(x) = \arctg \frac{2 + \sin x}{2 \cos x}$

$X = \mathbb{R} \setminus \bigcup_{k \in \mathbb{Z}} \{(2k+1)\frac{\pi}{2}\}$

$\nearrow [-\frac{\pi}{6} + 2k\pi, \frac{\pi}{2} + 2k\pi[,] \frac{\pi}{2} + 2k\pi, \frac{5\pi}{6} + 2k\pi], \searrow [-\frac{5\pi}{6} + 2k\pi, -\frac{\pi}{2} + 2k\pi[,] -\frac{\pi}{2} + 2k\pi, \frac{\pi}{6} + 2k\pi], \cup]-\frac{\pi}{2} + 2k\pi, \frac{\pi}{2} + 2k\pi[, \cap] \frac{\pi}{2} + 2k\pi, \frac{3\pi}{2} + 2k\pi[$

$-\frac{\pi}{6} + 2k\pi = pm, \frac{5\pi}{6} + 2k\pi = pM, \inf f = -\frac{\pi}{2}, \sup f = \frac{\pi}{2}$

$$f(x) = x + 4 \arcsin \frac{e^x - \sqrt{e}}{e^x + \sqrt{e}}$$

$$X = \mathbb{R}, \nearrow \mathbb{R}$$

$$y = x + 2\pi, y = x - 2\pi$$

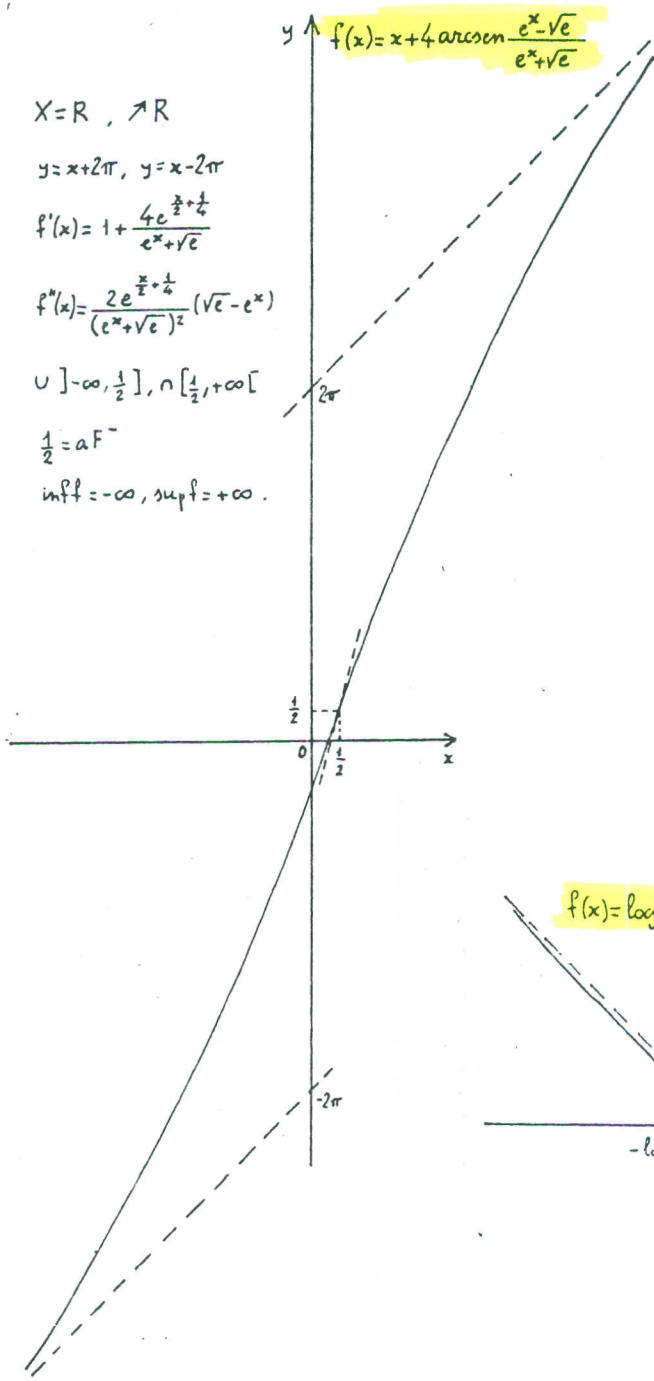
$$f'(x) = 1 + \frac{4e^{\frac{x}{2} + \frac{1}{4}}}{e^x + \sqrt{e}}$$

$$f''(x) = \frac{2e^{\frac{x}{2} + \frac{1}{4}}(\sqrt{e} - e^x)}{(e^x + \sqrt{e})^2}$$

$$U]-\infty, \frac{1}{2}], \cap [\frac{1}{2}, +\infty[$$

$$\frac{1}{2} = aF^-$$

$$\inf f = -\infty, \sup f = +\infty.$$



$$X = \mathbb{R} - \{0\}$$

$$\nearrow]0, +\infty[, \searrow]-\infty, 0[$$

$$\cap]-\infty, 0[,]0, +\infty[$$

$$\inf f = -\infty, \sup f = +\infty$$

$$\longleftarrow y = -x - \log 2, \longrightarrow y = x - \log 2$$

$$f(x) = \log |\sinh x|$$

