$$\lim_{x\to\infty}(*) = \lim_{x\to\infty}\frac{-\sin\left(\frac{1}{x}\right)\left(-\frac{1}{x^2}\right) - \sin\left(\frac{1}{x}\right) - x\cos\left(\frac{1}{x}\right)\left(-\frac{1}{x^2}\right)}{\frac{1}{x}\left(-\sin\left(\frac{1}{x}\right)\right)\left(-\frac{1}{x^2}\right) + \left(-\frac{1}{x^2}\right)\cos\left(\frac{1}{x}\right)}$$

"$\frac{0}{0}$" — L'Hôpital

$$= \lim_{x\to\infty}\frac{-\sin\left(\frac{1}{x}\right) + \sin\left(\frac{1}{x}\right)x^2 - x\cos\left(\frac{1}{x}\right)}{-\frac{\sin\left(\frac{1}{x}\right)}{x} + \cos\left(\frac{1}{x}\right)} = (\text{GRENSE})$$

($\sin\left(\frac{1}{x}\right) \to 0$, $x^2 \to \infty$, $x\cos\left(\frac{1}{x}\right) \to \infty$; $\frac{\sin\left(\frac{1}{x}\right)}{x} \to 0$, $\cos\left(\frac{1}{x}\right) \to 1$)

$:= K$

VM: $\lim_{x\to\infty}\left\{x^2\sin\left(\frac{1}{x}\right) - x\cos\left(\frac{1}{x}\right)\right\} = \lim_{x\to\infty} x\left(x\sin\left(\frac{1}{x}\right) - \cos\left(\frac{1}{x}\right)\right)$

($x \to \infty$, $\sin\left(\frac{1}{x}\right) - \cos\left(\frac{1}{x}\right) \to 1$)

$$= \lim_{x\to\infty}\frac{x\sin\left(\frac{1}{x}\right) - \cos\left(\frac{1}{x}\right)}{\frac{1}{x}}$$

"$\infty \cdot 0$"

$$= \lim_{x\to\infty}\frac{\sin\left(\frac{1}{x}\right) + x\cos\left(\frac{1}{x}\right)\left(-\frac{1}{x^2}\right) + \sin\left(\frac{1}{x}\right)\left(-\frac{1}{x^2}\right)}{-\frac{1}{x^2}}$$

"$\frac{0}{0}$" — l'H

$$= \lim_{x\to\infty}\left\{-x^2\sin\left(\frac{1}{x}\right) + x\cos\left(\frac{1}{x}\right) + \sin\left(\frac{1}{x}\right)\right\}$$

($\sin\left(\frac{1}{x}\right) \to 0$)

$$= -\lim_{x\to\infty}\left\{x^2\sin\left(\frac{1}{x}\right) - x\cos\left(\frac{1}{x}\right)\right\} + 0$$

OBS! Dette er K!

Så: $K = -K \Rightarrow K = 0$

$$\Rightarrow \lim_{x\to\infty}\left\{x^2\sin\left(\frac{1}{x}\right) - x\cos\left(\frac{1}{x}\right)\right\} = 0$$

Så: (GRENSE) $= \frac{0+0}{0+1} = \underline{\underline{0}}$

7.6: Arcusfunksjonene

1.) b) $\arcsin\left(\frac{\sqrt{2}}{2}\right) = \underline{\underline{\frac{\pi}{4}}}$ siden $\sin\frac{\pi}{4} = \frac{\sqrt{2}}{2}$

c) $\arcsin\left(\frac{\sqrt{3}}{2}\right) = \underline{\underline{\frac{\pi}{3}}}$ siden $\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$

For 1) f og g: se fasit av Klara Hveberg! (Google Kalkulus løsningsforslag!)

d) $\arcsin\left(-\frac{\sqrt{3}}{2}\right) = \underline{\underline{-\frac{\pi}{3}}}$ siden $\sin\left(-\frac{\pi}{3}\right) = -\frac{\sqrt{3}}{2}$

(se enhetssirkel)

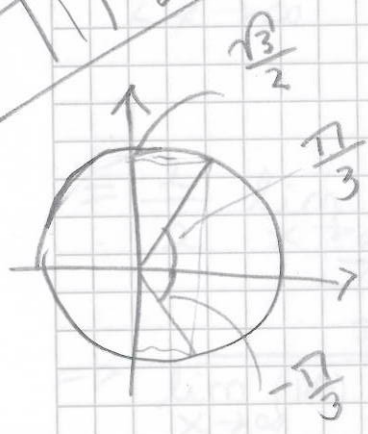
i) $\arctan\left(\frac{\sqrt{3}}{3}\right) = \arctan\left(\frac{1}{\sqrt{3}}\right) = \underline{\underline{\frac{\pi}{6}}}$

siden $\tan\left(\frac{\pi}{6}\right) = \frac{\sin\left(\frac{\pi}{6}\right)}{\cos\left(\frac{\pi}{6}\right)} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}$

$= \frac{1}{\sqrt{3}}$.

Eksakte verdier:

	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0



2) For a, b, c og e; se fasit av Klara Hveberg!