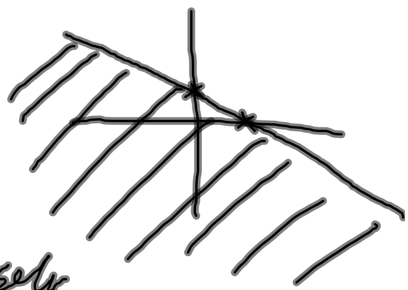
5.1.1

e) $\{ (x,y) \in \mathbb{R}^2 : x + 2y < 1 \}$



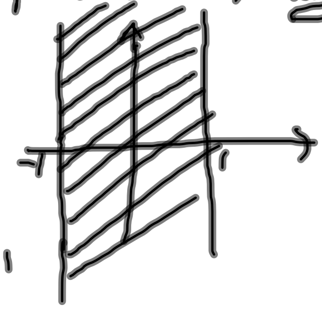
randen: $\{ (x,y) \in \mathbb{R}^2 : x+2y=1 \}$

randen er ikke inneholdt i mengden selv,
slik at mengden er <u>åpen</u>, (har ingen randpunkter)

f) $\{ (x,y) \in \mathbb{R}^2 : x+2y=1 \}$

randen = mengden selv $\Rightarrow$ mengden inneholder alle sine randpunkter $\Rightarrow$ <u>lukket</u>

g) $\{ (x,y) \in \mathbb{R}^2 : |x| \leq 1 \}$



rand $= \{ (x,y) \in \mathbb{R}^2 : |x| = 1 \}$
slik at randen er inneholdt i mengden,
som dermed er lukket.

5.1.2 c)

$$\lim_{n\to\infty} \vec{x}_n = \lim_{n\to\infty} \left(\sqrt{n^2+2n} - n ,\ \cos\frac{1}{n} ,\ \left(\cos\frac{1}{n}\right)^{n^2} \right)$$

$$= \left(\lim_{n\to\infty} \frac{(n^2+2n) - n^2}{\sqrt{n^2+2n}+n} ,\ \lim_{n\to\infty} \cos\frac{1}{n} ,\ \lim_{n\to\infty} \left(\cos\frac{1}{n}\right)^{n^2} \right)$$

$$= \left(\lim_{n\to\infty} \frac{2n}{\sqrt{n^2+2n}+n} ,\ 1 ,\ \lim_{n\to\infty} e^{\ln\left(\left(\cos\frac{1}{n}\right)^{n^2}\right)} \right)$$

$$= \left(\lim_{n\to\infty} \frac{2}{\sqrt{\frac{n^2+2n}{n^2}}+1} ,\ 1 ,\ e^{\lim_{n\to\infty} n^2 \ln\cos\frac{1}{n}} \right) \quad \left(x = \frac{1}{n}\right)$$

$$= \left(\frac{2}{1+1} ,\ 1 ,\ e^{\lim_{x\to 0} \frac{\ln\cos x}{x^2}} \right) \overset{LH}{=} \left(1, 1, e^{\lim_{x\to 0} \frac{-\sin x}{\cos x \, 2x}} \right)$$

$$= \underline{\underline{\left(1, 1, e^{-\frac{1}{2}} \right)}}$$