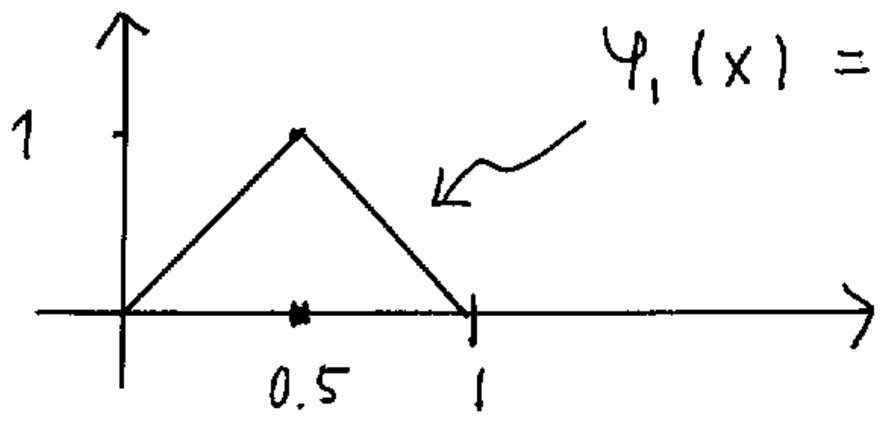
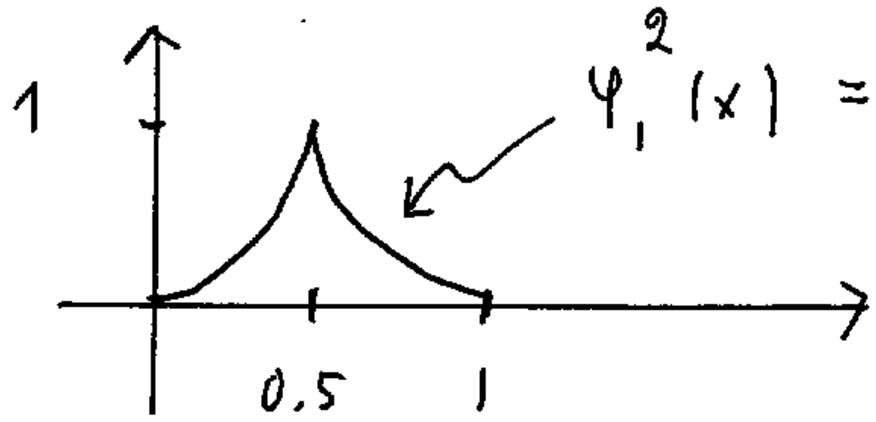
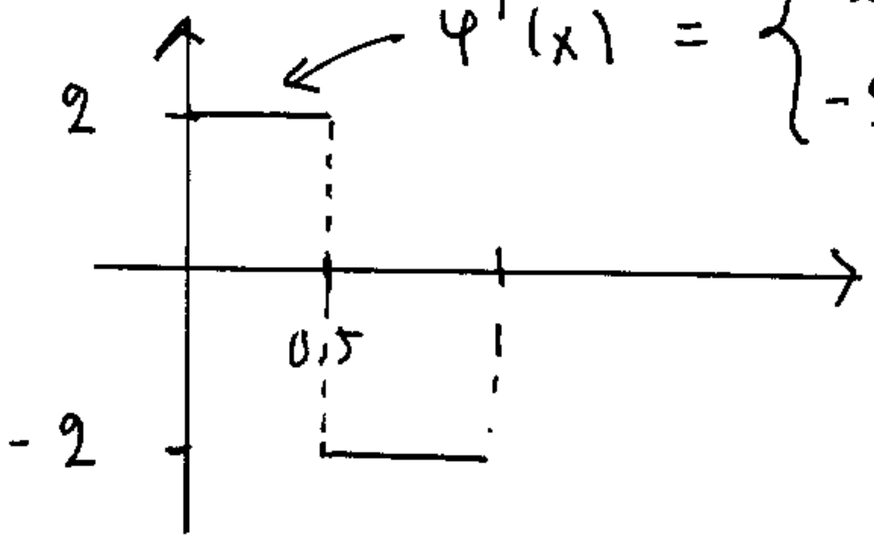
(e) forts.



$$\varphi_1(x) = \begin{cases} 2x, & x \in [0, \frac{1}{2}] \\ 2-2x, & x \in [\frac{1}{2}, 1] \end{cases}$$



$$\varphi_1^2(x) = \begin{cases} 4x^2, & x \in [0, \frac{1}{2}] \\ (2-2x)^2, & x \in [\frac{1}{2}, 1] \end{cases}$$



$$\varphi'(x) = \begin{cases} 2, & x \in [0, \frac{1}{2}] \\ -2, & x \in [\frac{1}{2}, 1] \end{cases}$$

Vi har integralerna

$$M_1 = \int_0^1 \varphi_1^2(x)\,dx = 2\int_0^{0.5} 4x^2\,dx = \frac{1}{3}$$

↑ symmetri

$$S_1 = \int_0^1 (\varphi_1'(x))^2\,dx = \int_0^1 4\,dx = 4$$

$$\tau_1 = \int_0^1 f(x)\varphi_1(x)\,dx = \int_0^{0.5} (x-x^2+2)2x\,dx + \int_{0.5}^1 (x-x^2+2)(2-2x)$$

= räkna för hand = $\frac{53}{48}$