(7.15) A swimming-pool reactor produces a flux of $3*10^{16}$ thermal neutrons $m^{-2}s^{-1}$ at 1 m from the reactor center. Assuming a parallel beam of neutrons diffusing up to the surface of the pool where the neutron flux is measured to be 10^8 n $m^{-2}s^{-1}$, calculate the thickness (x m) of the water layer required. For thermal neutrons the flux is reduced exponentially with the exponent $x*L^{-1}$, where L is the diffusion length (2.75 cm in H_2O).

$$fluxdamping := \frac{10^8}{3 \cdot 10^{16}} \qquad fluxdamping = 3.333 \cdot 10^{-9}$$

$L := 2.75 \cdot cm$

$thickness := -L \cdot ln(fluxdamping)$ $\qquad thickness = 0.537 \cdot m$ Answer: 0.537 meters