Problem 9: You invest 2000 USD at 10% yearly interest compounded continuously.
(you may use that $\ln 2 \simeq 0.69$, $e^{0.2} \simeq 1.221$, $e^{0.1} \simeq 1.105$, $e^{0.05} \simeq 1.051$)

(a) What is the amount after 2 years?

$$P(t) = P_0 e^{rt} = 2000 e^{(0.1)t}$$

$$P(2) = 2000 e^{(0.1)2} = 2000 e^{0.2}$$

$$\simeq 2000 \cdot (1.221)$$

$$= 2442 \text{ USD}$$

(b) How long will it take for the amount to double?

$P(t) = 4000$. Solve for t.

$$2000 e^{(0.1)t} = 4000$$

$$e^{(0.1)t} = 2$$

$$(0.1)t = \ln 2$$

$$t = 10 \ln 2 \simeq 6.9 \text{ yrs}$$