5. (a) How many years for $1000 to grow to $1,000,000 if compounded quarterly? Compounded quarterly at 10%/year.

$r = 10\% = .10$

$n = 4$

$$F = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$1{,}000{,}000 = 1{,}000\left(1 + \frac{.1}{4}\right)^{4t}$$

$$1000 = (1 + .025)^{4t}$$

$$1000 = (1.025)^{4t}$$

$$\ln 1000 = \ln\left[(1.025)^{4t}\right]$$

$$\ln 10^3 = 4t \cdot \ln(1.025)$$

$$3 \ln 10 = 4t \ln(1.025)$$

$$t = \frac{3}{4} \cdot \frac{\ln(10)}{\ln(1.025)}$$

$$\boxed{t \cong 69.9 \text{ years}}$$

(7)