1. The U.S. Government borrows money by issuing securities. The government offers T-bills often sold in durations of 91 days (13 weeks) or 182 days (26 weeks). A 13-week T-bill is a paper with an issue date and maturity date 13 weeks in the future. Upon maturity, the holder will receive the face value of the T-bill. The price at issue is set by the government.

Consider a 91-day T-bill with face value $1,000,000 and issue price 98 per 100 dollars of face value (consider 91-day period to be one quarter). Find the following:

(a) the one period interest amount
(b) the one period discount rate
(c) the one period interest rate
(d) nominal annual interest rate
(e) effective annual interest rate
(f) nominal annual discount rate
(g) effective annual discount rate

2. Show that the time $t$-value of an $n$-year annuity deferred with payments at $s$, $s + 1$, $\ldots$, $s + n - 1$ is

$$s | a_n = (1 + i)^{t-s} \frac{1 - v^n}{1 - v}.$$