SECTION 1.7

1.7.1 $i_{real} = \frac{i-r}{1+r} = \frac{.10-.15}{1+.15} = -.043478$

1.7.2 After-tax return is $\frac{(.12)(.55)-.10}{1.10} = -.0309.$

1.7.3 (a) Smith's ATI this year will be

$$21{,}000(.75)+21{,}000(.50)=26{,}250$$

and taxes paid will be 15,750. The real growth from last year to this year in Smith's ATI is $\frac{26{,}250/25{,}000}{1.05} = 1.00$, and the real growth in taxes paid is $\frac{15{,}750/15{,}000}{1.05} = 1.00.$

(b) Continuing the old taxation scheme, Smith's taxes paid this year will be $(.25)(20{,}000)+(.50)(22{,}000) = 16{,}000$, and his ATI will be 26,000. The real growth in taxes paid will be $\frac{16{,}000/15{,}000}{1.05} = 1.015873\,(1.59\%)$ and the real growth in ATI is $\frac{26{,}000/25{,}000}{1.05} = .990476 = 1-.009524(-.95\%).$

1.7.4 Smith sells the items for $100{,}000\times1.15 = 115{,}000$ at the end of the year and must pay back $100{,}000\times1.10 = 110{,}000$. Net gain is 5,000 (in year-end dollars).

1.7.5 $e^{\delta_{real}} = 1+i_{real} = \frac{1+i}{1+r} = \frac{e^{\delta}}{e^{\delta_r}} = e^{\delta-\delta_r}$

1.7.6 $\frac{.18-.14}{1.14} = \frac{i-1}{2} \rightarrow i = 1.070175\,(107\%)$

1.7.7 Smith needs $\frac{1000}{1.09} = 917.4312$ US now if he invests in the US account. This is equivalent to $\frac{917.4312}{.73} = 1256.7551$ Cdn., which grows to 1382.4306 in one year in a Canadian dollar account earning 10%. The implication is that one year from now, 1000 US ≡ 1382.4306 Cdn., or, equivalently, .723364 US ≡ 1 Cdn.

1.7.8 $(1+r)^n \cdot v^n = \left(\frac{1+r}{1+i}\right)^n = \frac{1}{\left(\frac{1+i}{1+r}\right)^n} = \frac{1}{(1+i')^n}$

$\rightarrow 1+i' = \frac{1+i}{1+r} \rightarrow i' = \frac{i-r}{1+r}$

1.7.9 (a) Real after-tax rate of return on standard term deposit is $\frac{i(1-t_x)-r}{1+r}$, and on the indexed term deposit is

$$\frac{r+i'(1+r)(1-t_x)-r}{1+r} = i'(1-t_x).$$

(b) Setting the two expressions in part (a) equal and solving for i, we have $i = i'(1+r)+\frac{r}{1-t_x}$.

If $i' = .02$ and $r = .12$, then $i =$ (i) .1424, (ii) .1824, (iii) .2224, (iv) .3224.