Calculating the Specified Discount Rate, R

The HP-12C assumes that the purchase price excludes accrued interest, whereas the actual purchase price of $1,012,500 includes accrued interest from 15 November 1990 to 12 March 1991. This accrued interest is calculated as follows, per $100 nominal:

Set up		(g) (D.MY)
Any YTM	0	(i)
Coupon % pa	14	(PMT)
Purchase date	12.031987	(STO)1
		(ENTER)
Maturity date	15.111988	(STO)2
		(f) (PRICE)
		(X ≷ Y) 4.524862

This accrued interest is then subtracted from the purchase price per $100 nominal, of $101.25, to give the ex-accrued interest purchase price.

Purchase price	101.25	(X ≷ Y)
		(−) 96.725138

The Specified Discount Rate (R) can then be calculated using the BOND YTM function;

Ex-accrued interest price	(PV)
Purchase date	(RCL)1
Maturity date	(RCL)2
	(f) (YTM) 16.265%

(3) *Example C*

(a) This example illustrates the application of this determination to a straightforward perpetual security. It is identical to Example C in Determination G10B: Present Value Calculation Methods.

The perpetual has a face value of 100, a yearly coupon of 10% paid half yearly, and was issued at 78.00 on 1 August 1991. The issuer is a New Zealand resident taxpayer with a 30 June balance date.

First we have to calculate the Annual Yield to Maturity Rate. Although outside the scope of this determination this can be done as follows:

Since all payments are the same, Method A formula (i) of Determination G10B: Present Value Calculation Methods applies. The present value is 78.00 at the date of issue which is equal to:

$$\frac{E}{F}$$

where, E is the halfyearly coupon, 5%.

Therefore,

$$78.00 = \frac{5.00}{F}$$

whence

$$F = \frac{5.00}{78.00} = 0.06410$$

and so the Specified Discount Rate in Determination G10B: Present Value Calculation Methods is

$$R = 100 \times N \times F = 100 \times 2 \times 0.06410 = 12.82\%$$

and this is the Annual Yield to Maturity Rate.

(b) Since the balance date is not a date on which an amount is payable, formula (ii) of Method A must be used to calculate the present value at the balance date, using the present value as at the immediately succeeding payment date and the payment then due.

(c) There are 32 days from 30 June to 1 August so that in all years—

$$N = \frac{365}{32}$$

$$F = R/(100 \times N) = 12.82/(100 \times 365/32) = 0.01124$$

$$1 + F = 1.01124$$

From Example C of Determination G10B: Present Value Calculation Methods, the present values at each balance date are calculated as follows:

	Next Period End			
Balance Date	Date	Present Value A	Payments by issuer B	Present Value at balance date (1)
30/6/91	1/8/91	78.00	5.0	82.08
30/6/92	1/8/92	78.00	5.0	82.08
30/6/93	1/8/93	78.00	5.0	82.08
.....	.....	.....	.....	.....

Note: C = 0 in all cases
(1) calcalated as (A + B − C)/(1 + F)

(d) The following schedule may then be constructed, showing the expenditure incurred by the issuer in respect of each income year:

Income Year Ending 30 June	Present Value at year end	Payments in year by—		Expenditure Incurred by issuer
		Holder	Issuer	
	(a) or (d)	(b)	(c)	
1991	82.08	78.00	–	4.08 (i)
1992	82.08	–	10.00	10.00 (ii)
1993	82.08	–	10.00	10.00 (ii)
1994	82.08	–	10.00	10.00 (ii)
.....	.....	.....	.....	.....

Notes:
(i) 82.08 − 78.00 = 4.08
(ii) 82.08 + 10.00 − 82.08 = 10.00

The constant expenditure from 30 June 1992 income year onwards is to be expected, and would only change if the issuer's balance date changed, or there was a change in the terms of the security.

Unless the perpetual security is repaid under the terms of its issue (such as default), there will never be a base price adjustment.

(4) *Example D*

(a) This example illustrates the application of Method A to a more complicated perpetual note than in Example C. It is identical to Example D in Determination G10B: Present Value Calculation Methods.

The note was issued at 90.00 on 1 February 1991. It has a nominal capital of 100 and has coupon interest at 14% p.a. commencing on 1 August 1993 and payable halfyearly thereafter on 1 February and 1 August each year in perpetuity. The nominal capital is repayable only if the issuer defaults on a coupon payment. The issuer is a New Zealand resident taxpayer with a 30 June balance date.

The first step is to determine the Annual Yield To Maturity Rate. This must be done by trial and error.

The process is as follows:

(i) Estimate F, the interest rate per period in decimal form. (For example, an Annual Yield To Maturity Rate of 14% payable quarterly gives F = 0.035).

(ii) Using Method A formula (i) of Determination G10B: Present Value Calculation Methods, calculate the present value as at the first payment date after which all amounts payable are the same, in this case as at 1/2/93.