months, so that N = 2; in the first (broken) period ending on 15 May 1987

$$N = \frac{365}{64} = 5.703125$$

The specified rate R is 16.2308% per annum.

Therefore F = 0.028459 in the period ending 15/5/1987 and 0.081154 in all the remaining periods.

(b) The following schedule may then be constructed, starting at the bottom and working up:

Period Ending	*Present Value at Beginning*	*Payments by Issuer* B	*Payments by Holder* C	*Present Value at End* A
15/5/87	1,012,500	70,000	–	971,315
15/11/87	971,315	70,000	–	980,141
15/5/88	980,141	70,000	–	989,683
15/11/88	989,683	1,070,000	–	–

The present value at the beginning of the first period is the same as the acquisition price, verifying that the specified rate is equal to the yield to maturity for this transaction.

(2) *Example B*—(a) This example illustrates Method B, using the same example as in Determination G3: Yield to Maturity Method and Determination G11: Present Value Based Yield to Maturity Method, Example B.

On 12 March 1987 (the specified date) a holder acquires for $1,012,500 the right to receive the following income—

15 May 1987	$70,000
15 November 1987	$70,000
15 May 1988	$70,000
15 November 1988	$1,070,000

All amounts are expressed in New Zealand dollars.

Amounts are payable at regular half-yearly intervals, so that N = 2 and the preceding due date is 6 months prior to 15 May 1987, namely 15 November 1986.

Also, T1 = T2 except for the first (broken) period ending on 15 May 1987 for which

T1 = 15/5/87 − 12/3/87 = 64 days, and

T2 = 64 days + 12/3/87 − 15/11/86 = 181 days.

The specified rate R is 16.265% per annum. (See footnote to this Example B for details of calculating using the HP12C calculator.)

Therefore f = 0.081325, and
d = 1.028032 in the period ending 15/5/1987 and 1.081325 in all the remaining periods.

(b) The following schedule may then be constructed, starting at the bottom and working up:

Period Ending	*Present Value at Beginning*	*Payments by Issuer* B	*Payments by Holder* C	*Present Value at End* A
15/5/87	1,012,500	70,000	–	970,884
15/11/87	970,884	70,000	–	979,841
15/5/88	979,841	70,000	–	989,527
15/11/88	989,527	1,070,000	–	–

The present value at the beginning of the first period is the same as the acquisition price, verifying that the specified rate is equal to the yield to maturity for this transaction.

(c) *Footnote:* The calculations in Example B may be made using the BOND PRICE and BOND YTM functions on the HP12C (or equivalent) calculator.

(i) *Calculating the Specified Rate, R.* The HP12C assumes that the purchase price excludes accrued interest, whereas the actual purchase price of $1,012,500 includes accrued interest from 15 November 1986 to 12 March 1987. This accrued interest is calculated as follows, per $100 nominal:

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

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

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

The specified 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

(ii) *Calculating the present values.* The "Present Values at Beginning" shown in the schedule may be calculated directly using the BOND PRICE function. The following steps reproduce the value at 15 November 1987 for example:

Specified rate	16.265	(i)
Coupon % pa	14	(PMT)
Value date	15.111987	(ENTER)
Maturity date	15.111988	(f) (PRICE) 97.984116
Add accrued interest		(+) 97.984116

which is the per $100 nominal price corresponding to $979,841.

This Determination is signed by me on the 21st day of November in the year 1988.

R. D. ADAIR, Deputy Commissioner. 20

go14826

Determination G11: Accrual Income and Expenditure Using Present Value Based Yield to Maturity Method

This determination may be cited as "Determination G11: Present Value Based Yield to Maturity Method".

1. *Explanation* (which does not form part of the determination.) (1) This determination states how the yield to maturity method shall be applied to a financial arrangement to calculate income derived or expenditure incurred for purposes of section 64C of the Income Tax Act, 1976.

(2) This determination is an alternative to Determination G3: Yield to Maturity Method and will give very similar answers when used with Method A of Determination G10: Present Value Calculation Methods.

(3) The determination applies to any financial arrangement where all the amounts and dates are known not later than the first balance date of the issuer or holder after issue or acquisition, as the case may be, and determined in a single currency.

(4) The approach adopted is to define a constant annual interest rate representing the yield to maturity of all the cash flows in the financial arrangement. Income derived and expenditure incurred is assumed to be compounded on the date of each payment. The calculations are simplified by using regular periods such as half years, months or weeks, where most or all of the cash flows occur at such intervals. However, where a period between payments is longer than one year, income derived and expenditure incurred must be compounded at yearly intervals.

(5) In general, there is no explicit formula for a yield to