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# **SIMPLE INTEREST AMORTIZATION TABLES FOR INSTALLMENT SALES**

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## SIMPLE INTEREST AMORTIZATION TABLES FOR INSTALLMENT SALES

### Introduction

Federal income tax law requires a seller to charge a buyer interest on installment sales of farmland and other property which qualifies for capital gain, or the Internal Revenue Service will impute an interest charge. It is not well known that the required interest rate is simple interest, not compound interest. In recent years the required rate has been six percent simple interest with the imputed rate at seven percent interest compounded semiannually. A recently proposed regulation would increase the required rate from six percent simple interest to nine percent simple interest and the unstated rate from seven to ten percent interest compounded semiannually. If this proposed regulation becomes final, the new rates will be effective for installment sales on or after September 29, 1980. The Treasury is also considering adopting self-adjusting interest rates at some time in the future.

Many taxpayers have used six percent compound interest erroneously believing it is the lowest interest rate allowed. However, computing interest at simple interest rather than compound interest results in lower interest charges. A lower interest charge will result in an increased sales price, resulting in a shift from ordinary income to capital gain income. Lower interest may also be desirable in family transactions.

A simple example can demonstrate the difference between simple and compound interest. If a taxpayer sells property for \$10,000 but will not collect or report the income for three years, under the proposed regulations, he is required to charge nine percent simple interest. Nine percent simple interest for three years is total interest of 27 percent (3 years x 9 percent). When he is paid the \$10,000 deferred payment, he must also receive \$2700 interest. If instead he had charged nine percent interest compounded annually, the total interest for three years would be 29.5 percent  $((1.09)^3 - 1)$  or \$2950.

### Amortization of Installment Payments

The difference between simple and compound interest also exists in multi-payment installments. Debt is amortized with compound interest by the formula:

$$P = \frac{A}{(1+i)} + \frac{A}{(1+i)^2} + \dots + \frac{A}{(1+i)^n}$$

where P is the amount of debt, A is the level periodic payment consisting of principal and interest, i is the interest rate charged per period, and n is the number of periods. Rather than use this formula or a condensed version to amortize debt and interest into level payments (A), it is much simpler to use tables which have been prepared for a multitude of interest rates and payment terms.

Amortizing debt with simple interest requires the formula:

$$P = \frac{B}{(1+i)} + \frac{B}{(1+2i)} + \dots + \frac{B}{(1+ni)}$$

where P, i and n are defined as before and B is the level periodic payment consisting of principal and interest. This formula cannot be condensed to a simple version. Fortunately, it is possible to prepare tables to help compute simple interest payments (B) for various interest rates and payment terms.

With the same debt, interest rate, and payment period the simple interest rate formula requires lower payments than the compound interest rate formula. This occurs because the sum of the denominator terms in the simple interest rate formula is less than in the compound interest rate formula. Thus, the payments (B) with simple interest will be smaller than the payments (A) with compound interest for the same amount of debt (P).

### Simple Interest Rate Amortization Tables

Internal Revenue Code section 463 and Regulation 1.463-1 state how interest on an installment sale is to be calculated for federal income tax. Proposed Regulation 1.483-1(d)(1)(ii)(C) increases the specified rate to nine percent simple interest and the imputed rate to 10 percent interest compounded semiannually. If interest in the installment sale is computed at nine (six) percent simple interest or a higher rate, then it is not necessary to compute any unstated interest. If the interest portion of the installment payments is lower than nine (six) percent simple interest, then a ten (seven) percent interest rate compounded semiannually is used to compute the unstated interest. Present value tables printed in Regulation 1.463-1 are used to determine if the simple interest rate test is met.

The present value Tables V and VI in Regulation 1.463-1 were used to compute the six percent simple interest rate amortization Tables 1 and 2. The present value Tables VIII and IX in the proposed regulations were used to compute nine percent simple interest rate amortization Tables 3 and 4. Tables 1 and 3 are for semiannual payments. Tables 2 and 4 are for annual payments. The amortization factors in Tables 1 through 4 were computed by taking the present value factors in the regulation tables (column (a) of those tables), dividing by the number of payments and then inverting the result. For example, from Table VI the present value factor at six percent simple interest when the amortization is for 20 years is 12.87222. Dividing 12.87222 by 20 gives .643611. The inverse of .643611 is 1.5537335. This number is located in Table 2 as the principal and interest paid per dollar borrowed when there are 20 annual payments.

There is no standard procedure to separate a simple interest installment payment into principal and interest. With compound interest the unpaid balance (since the last payment) is multiplied by the interest rate to obtain the interest component of the payment. This technique cannot be used with simple interest because it results in too much interest being calculated. Another technique must be used.

For cash basis taxpayers the simplest procedure would be to prorate the principal and interest over the payment term. It appears that the tax courts generally agree that the matter of applying payments toward the reduction of the principal or toward interest payment concerns only the seller and buyer (See Commerce Clearing House - 1980 Standard Federal Tax Reports, ¶666.296). In fact, if the unstated interest rule applies, Code section 483 and regulations state that the unstated interest must be prorated over the installment period. For accrual taxpayers, the compound interest equivalent to the simple interest might be necessary to compute accrual interest.

To use an amortization table, find the correct table, then the number of installment payments and multiply the number in the adjoining column by the amount of the sales price not received as a down payment. Then divide that multiplication result by the number of installment payments to obtain the amount of each installment payment.

For example, in an installment sale of \$100,000 land, \$20,000 is received as a down payment and the remaining \$80,000 is to be paid in equal semiannual payments for 20 years at nine percent simple interest. To compute the semiannual installment payment, multiply 1.7728697 from Table 3 by \$80,000 to obtain \$141,829.58. This is the total amount, principal and interest, to be paid over 20 years. Of that amount \$80,000 is principal and \$61,829.58 is interest. Divide \$141,829.58 by 40, the number of payments, and the result is \$3,545.74 to be paid every six months for 20 years. As mentioned previously, the buyer and seller should agree how each installment payment should apply to principal and interest. If both are prorated over the installment period then each \$3,545.74 installment payment will break down into \$2,000 principal and \$1,545.74 interest.

If nine percent compound interest computed semiannually had been used to amortize this same installment sale rather than nine percent simple interest, the semiannual installment payment would be \$4,348 or \$802 more every six months. That amounts to \$16,040 more over the 20-year payment period.

### Implications

For transactions between family members it is often desirable to transfer property with the lowest income, gift, or estate tax consequence. If property is sold to a family member it must be sold at a reasonable market price or part of the transaction will be viewed as a gift. However, it is not necessary to charge any more than the minimum nine (six) percent simple interest on an installment sale regardless of market interest rates.

Installment sale transactions between unrelated parties can also be financed at the minimum nine (six) percent simple interest rate. If market interest rates are higher than this, the economic value of the lower interest rate will be bid into the price of the property. This may also be desirable in many family transactions. The conversion of interest to an increased sales price will depend upon the bargaining power of the seller and potential buyers. For the seller, interest income which is taxed as ordinary income may be converted to capital gain income, of which only 40 percent is added to taxable income. An increased sales price will generate additional interest to partially offset the initial reduction in interest.

In contrast, a buyer may prefer a higher interest rate since interest payments are current expense deductions. However, if part of the property is depreciable, a higher price would provide more depreciation expense. In some instances the depreciation expense deduction may be a faster tax write off than interest on the contract. Any portion of the higher sales price not depreciable may be recovered as a deduction at the time the property is resold. Property that qualifies for investment credit will also produce more credit at a higher price, subject to the limit allowed for used property.

### Conclusion

Federal income tax laws require the use of at least nine (six) percent simple interest with installment sales. It has been shown that nine (six) percent simple interest results in lower interest payments than nine (six) percent compound interest. Lower interest can be beneficial in family transactions. It can also be advantageous in sales to unrelated individuals and some family transactions since the sales price can be increased, resulting in a shift from ordinary income to capital gain income.

Table 1. Principal and Interest Paid per Dollar Borrowed at Six Percent Simple Interest, Semiannual Payments

Number of Payments	Principal and Interest	Number of Payments	Principal and Interest	Number of Payments	Principal and Interest
2	1.0447847	22	1.3176233	42	1.5612164
4	1.0739524	24	1.3430443	44	1.5844545
6	1.1026189	26	1.3681993	46	1.6075198
8	1.1308236	28	1.3931007	48	1.6304187
10	1.1585982	30	1.4177607	50	1.6531576
12	1.1859711	32	1.4421911	52	1.6757420
14	1.2129677	34	1.4664009	54	1.6981768
16	1.2396105	36	1.4904000	56	1.7204671
18	1.2659225	38	1.5141970	60	1.7646327
20	1.2919212	40	1.5377997	70	1.8728120

Table 2. Principal and Interest Paid per Dollar Borrowed at Six Percent Simple Interest, Annual Payments

Number of Payments	Principal and Interest	Number of Payments	Principal and Interest	Number of Payments	Principal and Interest
1	1.0600000	11	1.3331136	21	1.5772041
2	1.0891704	12	1.3585787	22	1.6004970
3	1.1178513	13	1.3837795	23	1.6236173
4	1.1460760	14	1.4087285	24	1.6465716
5	1.1738743	15	1.4334369	25	1.6693666
6	1.2012758	16	1.4579172	26	1.6920077
7	1.2283029	17	1.4821777	27	1.7144991
8	1.2549807	18	1.5062283	28	1.7368466
9	1.2813303	19	1.5300777	30	1.7811268
10	1.3073690	20	1.5537335	35	1.8895948

Table 3. Principal and Interest Paid per Dollar Borrowed  
at Nine Percent Simple Interest, Semiannual Payments

Number of Payments	Principal and Interest	Number of Payments	Principal and Interest	Number of Payments	Principal and Interest
2	1.0670252	22	1.4621875	42	1.8056905
4	1.1102199	24	1.4983032	44	1.8382284
6	1.1523791	26	1.5339649	46	1.8704966
8	1.1936076	28	1.5691997	48	1.9025053
10	1.2339936	30	1.6040328	50	1.9342667
12	1.2736122	32	1.6384847	52	1.9657892
14	1.3125291	34	1.6725773	54	1.9970820
16	1.3507992	36	1.7063277	56	2.0281544
18	1.3884711	38	1.7397539	60	2.0896684
20	1.4255879	40	1.7728697	70	2.2400953

Table 4. Principal and Interest Paid per Dollar Borrowed  
at Nine Percent Simple Interest, Annual Payments

Number of Payments	Principal and Interest	Number of Payments	Principal and Interest	Number of Payments	Principal and Interest
1	1.0900014	11	1.4859222	21	1.8306461
2	1.1332151	12	1.5221511	22	1.8633125
3	1.1754150	13	1.5579292	23	1.8957096
4	1.2167004	14	1.5932827	24	1.9278471
5	1.2571532	15	1.6282367	25	1.9597376
6	1.2968515	16	1.6628110	26	1.9913895
7	1.3358549	17	1.6970268	27	2.0228113
8	1.3742186	18	1.7309024	28	2.0540132
9	1.4119906	19	1.7644546	30	2.1157857
10	1.4492124	20	1.7976979	35	2.2668585



ADDENDUM

Simple Interest Amortization Tables for Installment Sales, A.E. Ext. 80-28

In the paper it was shown how multipayment installment sales can be arranged to satisfy the IRS minimum simple interest requirements. It was stated that the simplest way to divide simple interest installment payments into principal and interest components would be to prorate the principal and interest over the payment term. An alternative method would be to compute the actual accrued simple interest on each installment payment. That procedure is shown below.

Simple interest is based on the concept that interest is not compounded. Therefore, every payment consists of a principal component and simple interest that has accrued on that principal component. That can be stated as:

$$B = D+R \tag{1}$$

where B is the periodic payment consisting of principal D, and simple interest R. The simple interest R is computed as:

$$R = D(in) \tag{2}$$

where i is the interest rate charged per period, and n is the number of periods. Substituting equation 2 for variable R in equation 1 results in:

$$B = D+D(in). \tag{3}$$

Solving for D, the principal component, results in:

$$D = B/(1+in) \tag{4}$$

and then R, the interest component, is calculated as:

$$R = B-D. \tag{5}$$

An example in the publication had \$80,000 to be paid in equal semiannual payments for 20 years at nine percent annual simple interest. Each semiannual payment was computed to be \$3,545.74. The principal component of the first payment is calculated by equation 4 as  $\$3,545.74/(1+.045) = \$3,393.05$  and the interest component is calculated by equation 5 as  $\$3,545.74 - \$3,393.05 = \$152.69$ . The principal component of payment 30 (15 years) is  $\$3,545.74/(1+30(.045)) = \$1,508.82$  and the interest amount is  $\$3,545.74 - \$1,508.82 = \$2,036.92$ .