FACT SHEET

CALCULATING LOAN PAYMENTS

Wayne A. Hayenga*

If you've ever considered buying something on time but were reluctant to ask, "How much will the payments be?", you may find this fact sheet helpful. By following the explanations, you can learn how to use amortization tables to calculate payment size for equal payment loans.

When loans are repaid in a series of equal payments, the loan is *amortized*. Payments may be made monthly, quarterly, semi-annually or annually. Some principal and some interest is paid each time. As payments are made, the amount of principal increases and the amount of interest decreases. Table 1 illustrates the changes in principal and interest payments for a $10,000 loan at 8 percent interest amortized for 20 annual payments.

Table 1. Loan amortization—even payment plan for a $10,000 loan at 8% interest amortized over 20 years.

Years	Annual payment	Principal payment	Interest	Unpaid balance
				$10,000.00
1	$1,018.50	$218.50	$800.00	9,781.50
5	1,018.50	297.27	721.23	8,718.14
10	1,018.50	436.78	581.72	6,834.68
15	1,018.50	641.78	376.72	4,067.25
19	1,018.50	873.13	145.37	943.97
20	1,019.49**	943.97	75.52	—0—

**The amount of the last annual payment may vary from previous annual payments due to rounding of the amortization factor.

Short-Term Monthly Payment Loans

Short-term monthly payment loans are common for automobiles, appliances and some small business products. Interest charges on monthly payment loans usually are calculated by the add-on method. Interest is computed on the total amount borrowed for a specific time period. Interest then is added to the amount borrowed to determine the total amount to be repaid. This amount is divided by the number of months of amortization to determine the amount of each payment. For example, payments on a $3,000, 24-month loan at 6 percent add-on interest would be calculated as follows:

$$\frac{\text{amount}}{\text{of interest}} + \text{principal} \div \frac{\text{number}}{\text{of months}} = \frac{\text{monthly}}{\text{payment}}$$

$$[(\$3,000 \times .06 \times 2 \text{ years}) + \$3,000] \div 24 = \$140.00$$

Table 2 shows amortization factors in computing monthly payments for add-on interest loans.

To use Table 2 to compute monthly payments for the loan in the example above (a $3,000, 6 percent add-on interest, 24-month loan) multiply the 6 percent, 24-month amortization factor (.04667) by $3,000, which is $3,000 × .04667 = $140.01. The difference is due to rounding error.

Table 2. Monthly principal and interest paid per $1 borrowed to amortize a loan at various add-on interest rates and several lengths of repayment periods.

No. of monthly payments	4%	4½%	5%	5½%	6%	6½%	7%	8%
3	.33667	.33708	.33750	.33792	.33833	.33875	.33917	.34000
6	.17000	.17042	.17083	.17125	.17167	.17208	.17250	.17333
9	.11444	.11486	.11528	.11569	.11611	.11653	.11694	.11778
12	.08667	.08708	.08750	.08798	.08833	.08875	.08917	.09000
15	.07000	.07042	.07083	.07125	.07167	.07208	.07250	.07333
18	.05889	.05931	.05972	.06014	.06056	.06097	.06139	.06222
24	.04500	.04542	.04583	.04625	.04667	.04708	.04750	.04833
30	.03667	.03708	.03750	.03792	.03833	.03875	.03917	.04000
36	.03111	.03153	.03194	.03236	.03278	.03319	.03361	.03444
42	.02714	.02756	.02798	.02839	.02881	.02923	.02964	.03048
48	.02417	.02458	.02500	.02542	.02583	.02625	.02667	.02750
60	.02000	.02042	.02083	.02125	.02167	.02208	.02250	.02333

*Extension economist—agribusiness, The Texas A&M University System.

10.13

Long-Term Loans

Farm and home loans, building loans and major equipment loans often are repaid over several years. Interest rates for long-term loans usually are stated in an annual rate, commonly called simple interest. Table 3 shows amortization rates for annual payments at several interest rates and various time periods.

The annual payment for a $10,000 loan borrowed for 10 years at 7½ percent interest would be $1,456.90. This is calculated by multiplying the 7½ percent, 10-year amortization factor (.14569) by $10,000, which is $10,000 × .14569 = $1,456.90.

Table 3 also can be used to approximate monthly, quarterly or semi-annual payments for annual interest rate loans. This approximation is made by dividing the calculated annual payment by the number of payments to be made per year. The formula to estimate monthly, quarterly, or semi-annual payments is

$$\frac{(\text{amount of loan}) \times (\text{amortization factor})}{\text{number of payments per year}}$$

For a $25,000 loan at 8½ percent interest to be repaid in monthly installments over 25 years, payments would be approximately

$$\frac{\$25,000 \times .09771}{12} = \$203.56$$

This is slightly higher than the exact amount calculated from the appropriate amortization table but can be a useful aid in decision making.

Table 3. Annual principal and interest paid per $1 borrowed to amortize a loan at several annual interest rates and several lengths of repayment periods.

No. of annual payments	6%	7%	7½%	8%	8½%	9%	9½%	10%
3	.37412	.38105	.38454	.38803	.39154	.39506	.39858	.40211
4	.28859	.29523	.29857	.30192	.30529	.30867	.31206	.31547
5	.23740	.24389	.24717	.25046	.25376	.25709	.26044	.26380
6	.20336	.20980	.21305	.21631	.21961	.22292	.22625	.22961
7	.17914	.18555	.18880	.19207	.19537	.19869	.20204	.20540
8	.16104	.16747	.17073	.17401	.17733	.18068	.18405	.18744
9	.14702	.15349	.15677	.16008	.16342	.16680	.17020	.17364
10	.13587	.14238	.14569	.14903	.15241	.15582	.15927	.16275
12	.11928	.12590	.12928	.13270	.13615	.13965	.14319	.14676
15	.10296	.10979	.11329	.11683	.12042	.12406	.12774	.13147
20	.08718	.09439	.09809	.10185	.10567	.10955	.11348	.11746
25	.07823	.08581	.08971	.09368	.09771	.10181	.10596	.11017
30	.07265	.08059	.08467	.08883	.09305	.09734	.10168	.10608
35	.06897	.07723	.08141	.08580	.09019	.09464	.09914	.10369
40	.06646	.07501	.07940	.08386	.08838	.09296	.09759	.10226