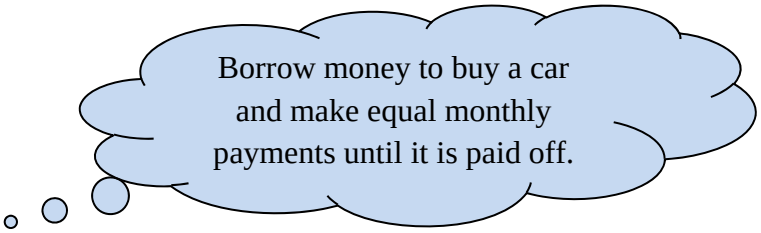


Business Mathematics
Class notes
Installment Loans (section 12.2)

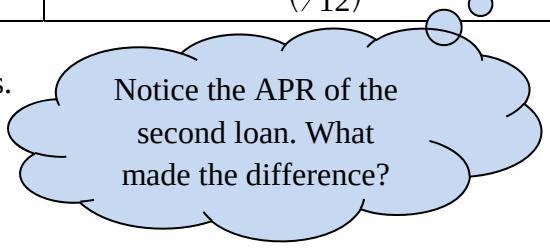
Use a bank to buy a house or car and you will pay equal periodic (for example, monthly) payments that cover the principal and interest. The loan is an **installment loan**. The payment method is called **amortizing a loan**. The **APR**, or **annual percentage rate**, is the interest rate charged per year.

The **nominal,** or **stated interest rate,** is the interest rate that is quoted to you. It may differ from the APR because this nominal rate may *not* be based on one year, but, say, on nine months. Let's see this play out in the following comparison of two possible loans.

Example: Nominal rate versus APR

	Loan amount	**Stated rate**	**Interest**	**Term**	**APR**
Loan #1	\$1000	10%	\$100	1 year	$R = \frac{I}{PT} = \frac{100}{1000 \times 1} = .10 = 10\%$
Loan #2	\$1000	10%	\$100	9 months	$R = \frac{I}{PT} = \frac{100}{1000 \times \left(9/12\right)} \approx .133 \approx 13.3\%$

A borrower has to be cautious when comparing loans. Be sure you know the terms and what they mean.



Definition: Total installment cost: the total amount paid for an object including interest and down payment, if paid.

You will find these formulas helpful.

Finding Total Installment Cost, Finance Charge, and Amount Financed:

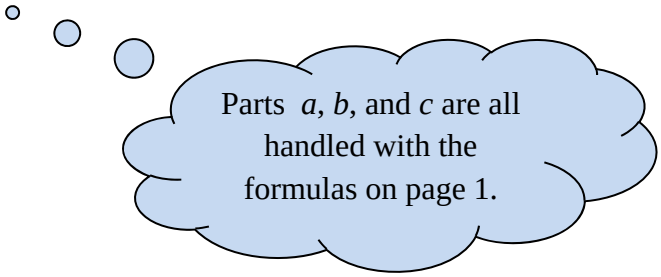
Total installment cost = Down payment + Payment amount x Number of payments

Finance charge = Total installment cost – Cash price

Amount financed = Cash price – Down payment

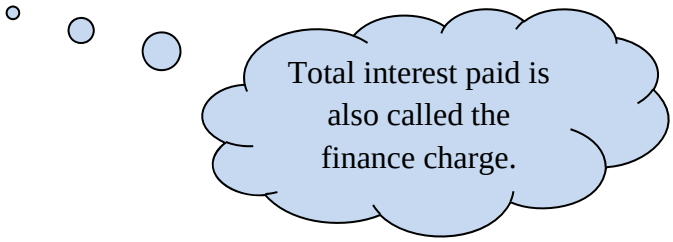
expl 1: James purchased a boat costing $12,800 with $500 down and loan payments of $399 per month for 36 months. Find the following.

a.) Find the amount financed.

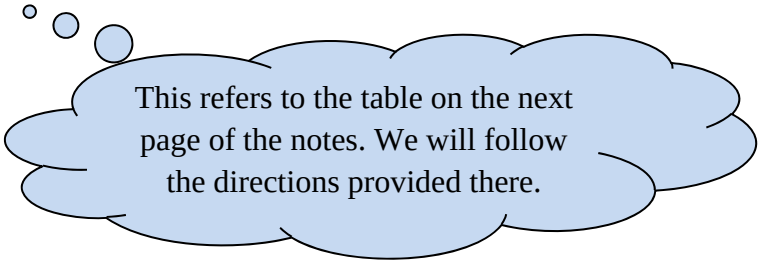


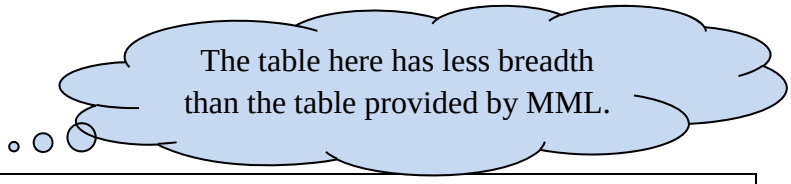
b.) Find the total installment cost.

c.) Find the total interest paid.



d.) Find the APR using the table.





Annual Percentage Rate (APR) for Monthly Payment Plans								
APR (Finance Charge per $100 of Amount Financed)								
Number of payments	**10 %**	**10.25 %**	**10.50 %**	**10.75 %**	**11 %**	**11.25 %**	**11.50 %**	**11.75 %**
12	5.50	5.64	5.78	5.92	6.06	6.20	6.34	6.48
24	10.75	11.02	11.30	11.58	11.86	12.14	12.42	12.70
26	11.64	11.94	12.24	12.54	12.85	13.15	13.45	13.75
28	12.53	12.86	13.18	13.51	13.84	14.16	14.49	14.82
30	13.43	13.78	14.13	14.48	14.83	15.19	15.54	15.89
31	13.89	14.25	14.61	14.97	15.33	15.70	16.06	16.43
32	14.34	14.71	15.09	15.46	15.84	16.21	16.59	16.97
33	14.79	15.18	15.57	15.95	16.34	16.73	17.12	17.51
34	15.25	15.65	16.05	16.44	16.85	17.25	17.65	18.05
35	15.70	16.11	16.53	16.94	17.35	17.77	18.18	18.60
36	16.16	16.58	17.01	17.43	17.86	18.29	18.71	19.14

How to use APR Table:

Step 1: Multiply the finance charge by $100 and divide by the amount financed. The result is the finance charge per $100 of amount financed.

Step 2: Read down the left column until you find the appropriate number of payments. Follow that row over until you find the value closest to the calculation from step 1. Follow that column up to read the APR.

Return to expl 1d: What is the APR for James' loan?

The available APR values are given for every quarter percent because that is the accuracy that federal law requires.

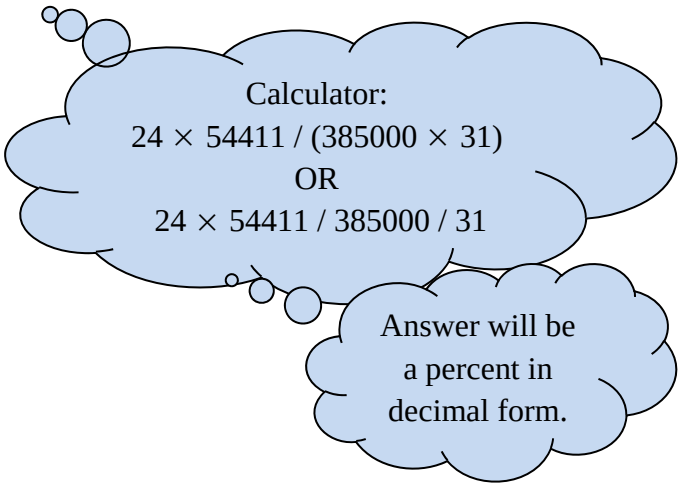
This table technically often gives an approximate APR but the book will refer to it as the exact APR. If you are asked for the *approximate* APR for a loan, you will use the formula given on the next page.

Formula for Approximate APR:

$$\text{Approximate APR} = \frac{24 \times \text{Finance charge}}{\text{Amount financed} \times (1 + \text{Number of payments})}$$

expl 2: Aluminum Cans Inc. purchased a new machine to press aluminum into cans and financed $385,000 over 30 months. The finance charge was $54,411.

a.) Estimate the APR using the formula above.



b.) Use the previous page's table to find the exact APR.