Warm up

22,000

Bob Grabola purchased a Sports car. He does not recall the APR on the loan but remembers that there are 60 payments of $456.68. If he did not make a down payment on the car, determine the APR.

Determine the finance charge.

Total = 60 (456.68) = 27400.80

− 22000 AF

5400.80 FC

Determine the APR. = $\frac{5400.80}{22000} \times 100 = 24.55\%$

Section 11.4 continued

Paying off a loan early means you should not have to pay the entire finance charge. The amount of the reduction for paying off the loan early is called **unearned interest.**

The most common way to calculate the unearned interest is, **the actuarial method**

The Actuarial Method

$$u = \frac{n \cdot P \cdot V}{100 + V}$$

n = number of remaining monthly payments (excluding current payment)

P = monthly payment

V = value from the APR table that corresponds to the number of remaining payments

EXAMPLE 4 *Using the Actuarial Method*

In Example 3, we determined the APR of Tino's loan to be 7.5%. Instead of making his 30th payment of his 48-payment loan, Tino wishes to pay his remaining balance and terminate the loan. P = 237

a) Use the actuarial method to determine how much interest Tino will save (the unearned interest, u) by repaying the loan early.

b) What is the total amount due to pay off the loan early on the day he makes his final payment?

$n = 48 - 30 = 18$ $P = 237$ $V = 6.04$

a) $$u = \frac{18(237)(6.04)}{106.04} = 242.99$$

b) $(18+1)(237) = 4503$

$4503 - 242.99 = 4260.01$

$12 - 6 = 6$

12 month

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17. ***Early Repayment of a Loan*** Ray Flagg took out a 60-month fixed installment loan of $12,000 to open a new pet store. He paid no money down and began making monthly payments of $232. Ray's business does better than expected and instead of making his 24th payment, Ray wishes to repay his loan in full.

a) Determine the APR of the installment loan.

b) How much interest will Ray save by paying off his loan early?

c) What is the total amount due to pay off the loan?

a) Total = 60(232)
= 13920
− 12000 AF
1920 FC

APR = $\frac{1920}{12000} \times 100 = 16\%$

b) $n = 60 - 24 = 36 \quad P = 232 \quad V = 9.52$

$u = \frac{36(232)(9.52)}{109.52} = \boxed{726}$

c) $(36+1)\,232 = 8584$
$- 726$
$\boxed{7858}$

18. ***Early Repayment of a Loan*** Jeslie Ann Hernandez has a 48-month installment loan with a fixed monthly payment of $83.81. The amount she borrowed was $3500. Instead of making her 18th payment, Jeslie Ann is paying the remaining balance on the loan.

a) Determine the APR of the installment loan.

b) How much interest will Jeslie Ann save by paying off the loan early?

c) What is the total amount due to pay off the loan?

a) $48(83.81)$

4022.88

$-\ 3500$ AF

522.88 FC

APR $\frac{522.88}{3500} \times 100 = 14.94$

7%

b) $n = 48 - 18 = 30$ $P = 83.81$ $V = 9.30$

$$u = \frac{30(83.81)(9.30)}{109.30} = 213.93$$

c) $(30+1)(83.81) = 2598.11$

$-\ 213.93$

2384.18

19. *Early Repayment of a Loan* Nina Abu buys a new sport utility vehicle for $32,000. She trades in her old truck and receives $10,000, which she uses as a down payment. She finances the balance at 8% APR over 36 months. Before making her 24th payment, she decides to pay off the loan.

a) Use Table 11.2 to determine the total interest Nina would pay if all 36 payments were made.

$\frac{22000}{100} \times 12.81 = 2818.20$

b) What were Nina's monthly payments?

$\frac{22000 + 2818.20}{36} = 689.39$

c) How much interest will Nina save by paying off the loan early?

d) What is the total amount due to pay off the loan?

c) $n = 36 - 24 = 12$ $P = 689.39$ $V = 4.39$

$u = \frac{12(689.39)(4.39)}{104.39} = 347.90$

d) $(12+1)(689.39) = 8962.07$

$- 347.90$

8614.17

Early Repayment of a Loan The cash price for a new washer and dryer for Toshio Nakamura's new apartment was $1250. Toshio made a $100 down payment and finance the balance on a 24-month fixed payment installment loan The monthly payments are $50.71. Instead of making his 12th payment, Toshio decides to pay off the loan.

a) Determine the APR on the installment loan.

b) How much interest will Toshio save by paying off the loan early?

c) What is the total amount due to pay off the loan?

teaching about money

http://www.youtube.com/watch?v=1y1haHDhWzA&feature=related

Credit cards

http://www.youtube.com/watch?v=OlIAueuxb9I&feature=related