235,596 25 6 6.44

Rate 6%

1/6 ~~25~~ 6.44

Loan 235,596

$6.44 \cdot 235 = 1517.40$ Per month 25yrs

$1517 \cdot 12 \cdot 25 = 455,100$

$455,100 - 235,596 = 219,504$

$2050 \cdot 12 \cdot 25 = 615,000$

Percent Homework

Big Questions

B8. Oregon Senate Bill 1105 limits payday loan interest rates to 36% or less. Before that bill was passed, payday loans in Oregon often had interest rates of 120%. Nationally, payday loans can have interest rates as high as 7,000%. The average payday loan is a two-week advance on $350. How much interest would be owed with an annual simple interest rate of 36%? 120%? 7,000%?

Part A

$$I = P \cdot r \cdot t$$

$$= \$350 \cdot 0.36 \cdot 2 \div 52$$

$$= \boxed{\$4.85}$$

Part B

120%

$$I = P \cdot r \cdot t = \$350 \cdot 1.2 \cdot 2 \div 52 = \boxed{\$16.15}$$

Part C

$$I = P \cdot r \cdot t = \$350 \cdot 70 \cdot 2 \div 52 = \boxed{\$942.31}$$

B9. As a birthday present, Janice receives a $50 gift certificate to her favorite restaurant. She invites two friends to join her for dinner there. She expect great service and plans to pay a 15% tip. Restaurant sales tax where she lives is 10%. What is the most she can pay for the food if she wants the gift certificate to also cover everyone's tip and tax?

25% extra total

what is 25 % of $50 ?

$y = 0.25 \cdot \$50$

$y = \$12.50$ tax and tip?

So $\$50 - \$12.50 = \$37.50$ food ?

check: what is 25% of $\$37.50$?

$+ \$9.38$

$\$46.88$ too small !

B9. As a birthday present, Janice receives a $50 gift certificate to her favorite restaurant. She invites two friends to join her for dinner there. She expect great service and plans to pay a 15% tip. Restaurant sales tax where she lives is 10%. What is the most she can pay for the food if she wants the gift certificate to also cover everyone's tip and tax?

25% extra total

100% food + 25% extra

$50 is 125 % of what ?

$50 = 1.25 · y

÷ 1.25 ÷ 1.25

$40 = y

$40 for food

check: What is 25% of $40 ?

+ $10

$50 ☺

B10. Bradley has heard that it is wise to spend no more than 25% of your income on your mortgage. He earns $39,600 per year. He wants a thirty-year home loan. Mortgage interest rates are at 5%. How large a loan can he afford? How much will he pay total over the thirty years? How much of that is interest? Where is one Lane County neighborhood that Zillow suggests is appropriate for Bradley?

30 years, 5% } $5.36

Per year he will spend

$39,600 · 0.25 = $9,900

so per month

$9,900 ÷ 12 = $825

so loan size

$825 ÷ $5.36 = 153.918

≈ $154,000 loan size

total payments

$825 · 12 · 30 years = $297,000 total

− $154,000

$143,000 interest

B11. The historical return for the stock market is about 11%. If the bank decided not to do business with Bradley, but instead invested the loan amount in the stock market, how much would the bank have after thirty years of 11% annual compound interest each year? Why would a bank choose to offer a mortgage to Bradley considering that stock market gain is so much smaller?

Compound Interest

$$\text{total} = \text{principal} \cdot \left(1 + \text{rate per payout}\right)^{\#\text{ of payouts}}$$

$$= \$154{,}000 \cdot 1.11^{30}$$

$$= \boxed{\$\,3{,}525{,}414}$$

B14. Cliff is Clara's husband. He stops smoking, and decides to devote the money he used to spend on cigarettes to retirement. He used to smoke 1 pack per day, at $5.70 per pack. How much money per year was Cliff spending on cigarettes? If he instead puts his "cigarette money" annually into a retirement account that earns 9% annual compound interest, how much will extra will he have for retirement after thirty years?

a) $\$5.70 \cdot 365 \approx \$2{,}080$

b) Sum of Annuity Due

Final Amount = [Principal × (1 + rate)$^{(\text{years} + 1)}$ − Principal × (1 + rate)] ÷ rate

$= \left(\$2080 \cdot 1.09^{31} - \$2{,}080 \cdot 1.09\right) \div 0.09$

$\approx \boxed{\$309{,}036}$

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Mortgages

Quiz Problems #1 to #3

$60,000

1. The Wahl family has an annual income of $[redacted]0. They want to spend 20% of that income on a mortgage with a twenty-year loan. How much are they prepared to pay each month?

2. Continuing with the Wahl family, if mortgage interest rates are at [redacted]% then how large a loan can they afford? 5%

3. Continuing with the Wahl family, how much will be paid total over the twenty years? How much of that is interest?

Amortization Table
(monthly payment per $1,000 of loan)

Rate \ Years	10	15	20	25	30
5%	$10.60	$7.91	$6.60	$5.85	$5.36
6%	$11.10	$8.44	$7.16	$6.44	$6.00
7%	$11.60	$8.99	$7.75	$7.07	$6.65
8%	$12.10	$9.56	$8.36	$7.72	$7.34

4. Does doubling the income double the size of the numbers? Next consider the Moneybag family that has an annual income of $90,000, with everything else the same as the first problem. How large a loan can they afford? How much will be paid total over the twenty years? How much of that is interest?

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