Section 1.5 – Practice Problems

Loans and Lines of Credit

1. Ella is starting her own merchandising business, the bank extended her a line of credit up to
   $10 000. She withdraws money in different periods over the year, the interest rate is
   6.25%, compounded daily. Using the table below (two pages) calculate how much money
   Ella ended up paying in interest over the year.

This is 98 days in years

Withdrawn Amount	Time	Amount $$A = P\left(1 + \frac{r}{n}\right)^{nt}$$	Interest $I = A - P$
$5200	98 *days*	$A = 5200\left(1 + \frac{0.0625}{365}\right)^{365 \cdot \frac{98}{365}}$ when compounded daily they cancel if dealing with days. $A = 5200\left(1 + \frac{0.0625}{365}\right)^{98}$ $A = 5287.99$	$I = 87.99$
$2800	174 *days*	$A = 2800\left(1 + \frac{0.0625}{365}\right)^{174}$ $A = 2884.67$	$I = 84.67$

$2000	93 days	$A = P\left(1 + \dfrac{r}{n}\right)^{n \cdot t}$ $A = 2000\left(1 + \dfrac{0.0625}{365}\right)^{93}$ $A = 2032.10$	$I = 32.10$

Total Amount of Interest Ella paid is: $32.10 + 84.67 + 87.99$

$$\boxed{\$\,204.76}$$

2. Scott is a contractor and he buys supplies on his line of credit. The interest rate is $8.5\%/yr$ and is compounded daily. The Dover family that Scott was working for paid late, their invoice was for $3775.00. Scott took 45 days to pay his line of credit since he was paid late. He charges the clients for any interest accrued. How much interest did Scott charge the Dover family?

$P = 3775$

$t = \dfrac{45}{365}$ (45 days written as yrs)

$n = 365$

$r = 0.085$

$A = 3775\left(1 + \dfrac{0.085}{365}\right)^{\cancel{365} \cdot \frac{45}{\cancel{365}}}$

$A = 3814.76$

$I = 3814.76 - 3775$

$= 39.76$

$$\boxed{\text{HE CHARGES } \$\,39.76}$$

3. Jennifer and Maia are buying a new car, they need to finance it (use a line of credit). They are being offered two different options.

   Option 1: $37 500 vehicle, 2.9% $interest/yr$, compounded monthly over five years
   Option 2: $37 500 vehicle, 2.5% $interest/yr$, compounded annually over seven years

   Which option is the best and by how much money?

   option 1: $A = 37500 \left(1 + \dfrac{0.029}{12}\right)^{12 \cdot 5}$ $A = 43\,343.90$

   option 2: $A = 37500 \left(1 + \dfrac{0.025}{1}\right)^{7}$ $A = 44575.72$

   $44\,575.72 - 43\,343.90 = 1231.82$

   OPTION 1 Better by $1231.82

4. What are the advantages/disadvantages of a Home Equity line of credit?

   Answer will vary

   But think about how house value can fluctuate..

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5. Mark owes $42 000 in student loans. The interest rate is 16%/yr and is compounded daily, paid monthly. Mark decides to get a personal line of credit of to pay the student loan off. The line of credit charges 5.6%/yr compounded daily and paid monthly. How much money did Mark owe off of his first month (January – 31 days) payment by switching to the line of credit.

Student Loan: $A = 42000\left(1 + \frac{0.16}{365}\right)^{365 \cdot 1}$

$A = 49\ 285.73$

$I = 7285.73/yr \rightarrow \$19.96/day$

$19.96 \cdot 31 = \boxed{618.79}$

LOC: $A = 42000\left(1 + \frac{0.056}{365}\right)$

$A = 44\ 418.91$

$I = 2418.91/yr = \$6.63/day$

$6.63 \cdot 31 = \boxed{205.44}$

Interest Saved: $618.79 - 205.44 = \boxed{\$413.35}$

Credit Cards

6. Sara's credit card statement told her she could pay only a $23.00 minimum payment even though she owes $850. If her interest rate is 17.99%/yr compounded daily and paid monthly, she only pays the minimum payment and spends another $200 before her next bill, how much will her bill be worth? How much interest did she pay? (26 days compounding period)(Refer to the example for starting steps).

Interest on the whole bill.

$A = 850\left(1 + \frac{0.1799}{365}\right)^{365 \cdot 1} \rightarrow A = 1017.49$

Divide by 365

$I = \$167.49/yr$

$I = 0.46/day$

New Bill:

$850 - 23 + 200 + 11.93 = \boxed{\$1038.93}$

$I = 0.46 \cdot 26\ days$

$= \boxed{\$11.93}$

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7. Anil just got his first credit card, he went out and spent without thinking and was a little surprised when he received his first bill of $645. His annual interest rate is 14.99%, compounded daily. If he paid back $300, but did not spend any more money on the card the following month (Compound period 28 days), how much is his next bill going to be? How much interest did he pay? (Refer to the example)

$$A = 645\left(1 + \frac{0.1499}{365}\right)^{365} \longrightarrow A = 749.29$$

$$I = 104.29/yr$$

$$= \$0.29/day$$

New Total:

$$645 - 300 + 8 = \boxed{\$353}$$

Over 28 days $= \boxed{\$8.00}$

8. Nathalie is considering a credit card to pay for gas for her work vehicle. She spends $1450 on gas a year, the card offers a refund of 2% on all the gas she buys, but has an annual fee of $50. Should she get the card?

$$1450 \cdot 0.02 = \$29 \text{ cash back}$$

$\$50$ annual fee so still losing out on $\$21$

NOT WORTH IT!

9. Why might you choose a card with a high interest rate or annual fee?

If you are comfortable with your ability to pay in full, it could have very good rewards.

10. Why is it important to pay off the entire credit card balance every cycle.

So you DO NOT PAY INTEREST.