

You have received your monthly credit card statement and must now deal with the financial realities of last month's birthday celebration. While your milestone in years was deserving of a celebration, dealing with the \$1900 in credit card charges will require some planning.

Your credit card statement lists the APR (Annual Percentage Rate) for your balance to be 13.5%. This is the yearly interest rate the credit card company uses in calculating interest due on your balance. The credit card company compounds interest monthly. Your monthly interest rate on credit card charges will be:

$$i = \frac{APR}{12} = \frac{0.135}{12} \approx 0.01125$$

The minimum payment required by your credit card company is \$25/month. Assuming that you do not make any new charges to your account, answer the following questions to help you determine the best plan for paying off this credit card debt.

1. To begin with, let's check out the plan of only paying the minimum amount due each month. To get a feel for how this will affect the balance, finish filling in the following table using the minimum monthly payment of \$25.

| Month | Old Balance | Interest | Payment | New Balance |
|-------|-------------|----------|---------|-------------|
| 1 | \$1900.00 | \$21.38 | \$25.00 | \$1896.38 |
| 2 | \$1896.38 | \$21.55 | \$25.00 | \$1892.71 |
| 3 | \$1892.71 | \$21.79 | \$25.00 | \$1889.00 |
| 4 | \$1889.00 | \$21.25 | \$25.00 | \$1885.25 |
| 5 | \$1885.25 | \$21.21 | \$25.00 | \$1881.46 |
| 6 | \$1881.46 | \$21.17 | \$25.00 | \$1877.63 |
| 7 | \$1877.63 | \$21.17 | \$25.00 | \$1873.75 |
| 8 | \$1873.75 | \$21.08 | \$25.00 | \$1869.83 |
| 9 | \$1869.83 | \$21.04 | \$25.00 | \$1865.87 |
| 10 | \$1865.87 | \$20.99 | \$25.00 | \$1861.86 |
| 11 | \$1861.86 | \$20.95 | \$25.00 | \$1857.81 |
| 12 | \$1857.81 | \$20.90 | \$25.00 | \$1853.71 |

What is the total amount that has been paid to the credit card company at the end of the first year?

\$300 has been paid to the credit card company, but only \$40.29 has gone to paying the balance off.

How much of the original balance has been paid off at the end of the first year?

\$40.29

From looking at the new balances over the first year, how many years do you think it will take to pay off the \$1900? (This is a guess so there is no wrong answer. Before going on to step 2, write down your best estimate.)

20 years

2. A formula for calculating the payment, P , required to pay off a debt of amount D in M months with monthly interest rate i is

$$P = \frac{D \cdot i}{1 - (1+i)^{-M}}$$

Using this formula, solve for M to determine the number of months it will take to pay off the \$1900 credit card debt with minimum monthly payments of \$25. Round the number of months to two decimal places. (Attach all work for this assignment to the end.)

172.61 months

How long is this in years, rounded to the nearest tenth of a year?

14.4 years

What is the total amount paid to the credit card company, rounded to the nearest dollar?

\$4315

3. How many months will be required to pay off the debt if you pay \$50 each month? Round to two decimal places.

49.86 months

How long is this in years, rounded to the nearest tenth of a year?

4.2 years

What is the total amount paid to the credit card company, rounded to the nearest dollar?

\$2493

4. How many months will be required to pay off the debt if you pay \$75 each month? Round to two decimal places.

29.99 months

How long is this in years, rounded to the nearest tenth of a year?

2.5 years

What is the total amount paid to the credit card company, rounded to the nearest dollar?

\$2249

5. How large would your monthly payment have to be in order to pay off your debt in 12 months? Round up to the next nearest cent.

\$170.15

What is the total amount paid to the credit card company, rounded to the nearest dollar?

\$2041.80

6. What is the best plan for paying off the \$1900? Why?

Pay the bill off as fast as possible. The faster it's paid off, the less the total amount.

What is the worst plan? Why?

- 1) Don't pay the bill - debt collectors/runned credit.
- 2) Make only the minimum payment - end up paying way more in total.

What should you do if you cannot afford to make the payments required by the best plan?

Pay as much as you can.

7. What are two things that the average consumer can learn by completing this assignment?

- i. Don't use a credit card. If you can't afford it, don't buy it.
- ii. pay off debt as fast as possible.

$$\#2) \quad 25 = \frac{1900 \times .01125}{1 - (1 + .01125)^m}$$

$$25 [1 - (1 + .01125)^m] = 1900 \times .01125$$

$$1 - (1 + .01125)^{-m} = \frac{1900 \times .01125}{25}$$

$$-(1 + .01125)^{-m} = \frac{1900 \times .01125}{25} - 1$$

$$(1 + .01125)^{-m} = \frac{-1900 \times .01125}{25} + 1$$

$$\ln[(1 + .01125)^{-m}] = \ln\left(\frac{-1900 \times .01125}{25} + 1\right)$$

$$-m \times \ln(1.01125) = \ln\left(\frac{-1900 \times .01125}{25} + 1\right)$$

$$m = \frac{\ln\left(\frac{-1900 \times .01125}{25} + 1\right)}{-\ln(1.01125)}$$

$$m = \frac{\ln(.145)}{-\ln(1.01125)}$$

$$\boxed{m = 172.01}$$

$$\#3) \quad m = \frac{\ln\left(\frac{-1900 \times .01125}{50} + 1\right)}{-\ln(1.01125)}$$

$$m = \frac{\ln(.5725)}{-\ln(1.01125)}$$

$$\boxed{m = 49.80}$$

$$\#4) \quad m = \frac{\ln\left(\frac{-1900 \times .01125}{75} + 1\right)}{-\ln(1.01125)}$$

$$m = \frac{\ln(.715)}{-\ln(1.01125)}$$

$$\boxed{m = 29.99}$$