***“DEBTING” 101 AND INVESTING 102 – AMORTIZATION TABLES***

Interest rate per compounding period:

I need to pay back my credit card bill of $4000. I am able to pay back $500 every month.   
The interest rate my credit card charges is 20% per year.   
Determine, using the table below, the following:  
a) how long it will take to pay back b) how much in total I pay back

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (# months) |  | Interest rate per compounding period times previous balance | Payment minus Interest | Previous balance minus Principal |
| PERIOD | PAYMENT | INTEREST | PRINCIPAL | BALANCE |
| 0 |  |  |  | $4000 |
| 1 | 500 |  |  |  |
| 2 | 500 |  |  |  |
| 3 | 500 |  |  |  |
| 4 | 500 |  |  |  |
| 5 | 500 |  |  |  |
|  | 500 |  |  |  |
|  | 500 |  |  |  |
|  | 500 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

How long will it take to pay back the $4000? How much will I pay in interest? How much will I pay in total?

Now consider the following situations. We will use Microsoft Excel to answer them for us, because making those tables took FOREVER!!!

1. Your credit card bill is $1000. The credit card company   
   charges you 20% interest per year.   
   Every month you make the minimum payment of $20.   
   a) How long will it take for you to pay your bill?  
   b) How much did you pay in total?  
   c) How much interest did you pay?  
   d) How would the answers to a, b, and c change   
   if you paid back $40 per month instead of $20?
2. You buy a house and get a mortgage of $200 000. The bank charges you 4% interest per year. Every month your payment is $1250.  
   a) How long will it take for you to pay your bill?  
   b) How much did you pay in total?  
   c) How much interest did you pay?  
   d) If you double your monthly payment, how would it change your answers to a, b, and c?

I invest $100 every month for the next year. My investment earns 5% per year.   
Determine, using the table below,   
a) How much I will have at the end of the year b) How much I earned in interest

Interest rate per compounding period:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| (# months) |  | Interest rate per compounding period times previous balance | Deposit plus interest | Previous balance plus gain |
| PERIOD | DEPOSIT | INTEREST | GAIN | BALANCE |
| 0 |  |  |  | $0 |
| 1 | 100 |  |  |  |
| 2 | 100 |  |  |  |
| 3 | 100 |  |  |  |
| 4 | 100 |  |  |  |
| 5 | 100 |  |  |  |
| 6 | 100 |  |  |  |
| 7 | 100 |  |  |  |
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|  |  |  |  |  |

a) How much I will have at the end of the year? b) How much I earned in interest?

Now consider the following situations. We will use Microsoft Excel to answer them for us, because making those tables took FOREVER!!!

1. You invest $30 every month (the equivalent of $1/day) for the next 25 years. Your investment earns 5% interest per year.   
   a) How much will you have after 25 years?  
   b) How much did you invest in total?  
   c) How much interest did you earn?  
   d) If your investment was actually earning 10% interest, how would your answers change? Note the difference in interest earned when the rate is doubled!
2. A smoker smokes a pack of cigarettes per day. That’s about $10 per day, or $300 per month. He decides to quit smoking, and instead to invest his money every month. His investment earns 4% per year.  
   a) How long will it take for him to be a millionaire?  
   b) How much of the million was interest, and how much was paid by you?

Answers

1. a) 109 months = 9 years, 1 month b) $2168.01 c) $1168.01   
d) 33 months = 2 years, 9 months; $1304.42; $304.42

2. a) 230 months = 19 years, 2 months b) $286278.64 c) $86278.64 d) 94 months = 7 years, 10 months; $233004.34; $33004.34

3. a) $17865.29 b) $9000 c) $8865.29   
d) $39805; $9000; $30805

4. a) 750 months = 62 years, 6 months   
b) about $775000 was interest, and $225 000 was my money