The payday loan 1

(by Alan Champneys)

Loans-R-Us, a so-called pay-day loan shop, is offering three different interest rates

(a) 3500% per year,  
(b) 35% per month,  
(c) 1% per day,

Interest is charged at the beginning of each period. So that if I borrow £1 for just one hour, under interest rate (a) I would pay pay £36, under (b) I would pay £.35, and under (c) I pay £1.01.

Each time interest is charged, it is calculated on the whole amount owed, including any unpaid interest.

Calculate the total amount I would owe under each interest rate, if I were to borrow £1 for a whole year, under each interest rate scheme, assuming that I don’t pay anything back until the end of the year.

Which interest rate should I choose?
The payday loan 2

(by Alan Champneys)

You should have found that the amounts you pay back under each rate are:

(a) 3500% per year Total = £36, \hfill (1)
(b) 35% per month Total = \(£(1 + 0.35)^{12}\) = £36.64, \hfill (2)
(c) 1% per day Total = \(£(1 + 0.01)^{365}\) = £37.78. \hfill (3)

So you should choose option (c) even though it looks like the worst deal.

This is because of the exponential growth of compound interest, and shows how so-called "pay day loan" companies prey on the poor and vulnerable to make huge profits. It is also why, by law, all loans must specify an equivalent Annual Percentage Rate (APR). This calculation shows that the APR of a loan that is advertised as ‘1% per day’ is actually 3678 %, which does not sound so appealing.

But it gets worse. Suppose I choose rate (c) and borrow £1 for 5 years. How much would I owe at the end of 5 years?

What if I were to only pay back after 10 years? where could I find such money from?