

Chapter 2. Compound Interest

S2.1 I deposited some money into a savings account that compounds monthly. At 3%, 6%, 9% and 12% APR, how long will it take (to the nearest month) for my balance to double and how long for it to triple?

Use the Basic tab of the spreadsheet CH2CompoundInterest.xls. Start with (the Principal) of \$1.00. Set NrYears large enough so that you can scan down the Balance column and look for Balances of ~ \$2.00 and ~ \$3.00:

	APR			
	3.00%	6.00%	9.00%	12.00%
Double	278 mos	139	93	70
Triple	440	220	147	110

This can be done quite accurately without a spreadsheet. Follow the math if you're interested, just look at the result otherwise:

If P is the principal and i is the interest per month, then to double the principal after n months,

$$2P = P(1+i)^n$$

Dividing both sides by P and then taking the natural logarithm of both sides,

$$\ln(2) = .693 = n \ln(1+i)$$

or,

$$n = \frac{0.693}{\ln(1+i)}$$

Remembering that i is the interest per month, for APRs of about 12% or less, i is 0.01 or less and we may use the approximation

$$\ln(1+i) \approx \ln(1) + i = i$$

And therefore,

$$n \approx \frac{0.693}{i}$$

As an example, for an APR of 6%, $i = .06/12 = 0.005$ and the deposit will double in $0.693/0.005 = 139$ months (to the nearest month).

If you have the math background, derive the equivalent relationship for the deposit tripling and check it against the table above.

S2.2 USE PRORATION CAPABILITY TO DO ONE OF THESE TO THE NEAREST DAY