

## Formulae for calculation of interest, loan repayments and deposits

### Formula for calculation of compounded interest on deposit

**D** = initial deposit ( $D_0$ )

**r** = interest rate, if floating  $r_n$  is the interest rate in year **n**

**n** = year

$$D_n = D \cdot (1+r)^n \quad \text{at fixed interest rate}$$

$$D_n = D \cdot (1+r_1) \cdot (1+r_2) \cdot (1+r_3) \dots (1+r_n) \quad \text{at floating interest rate}$$

### Formula for calculation of loan repayments on self amortising loan

**L** = loan amount

**r** = interest rate, if floating  $r_n$  is the interest rate in year **n**

**n** = tenor of the loan (if the repayment period is 6 months, or 3 months, the number of the repayment periods equals the tenor multiplied by 2, or respectively 4, and the interest rate is the interest rate for that period)

end year 1      end year 2                      end year 3      .....      end year q

$$L/n + L \cdot r_1 \quad L/n + ((L - (L \cdot 1)/n) \cdot r_2) \quad L/n + ((L - (L \cdot 2)/n) \cdot r_3) \quad L/n + (((L - (L \cdot (q-1))/n) \cdot r_q)$$

### Formula for calculation of compounded constant (fixed) rate interest on self amortising loan (equal repayments of principal)

**L** = loan amount

**r** = interest rate

**n** = tenor of the loan

$$L \cdot r + (L - L \cdot 1/n) \cdot r + (L - L \cdot 2/n) \cdot r + (L - L \cdot 3/n) \cdot r + \dots + (L - L \cdot n/n) \cdot r$$

Total compounded interest payable over the life of the loan =  $((L \cdot r \cdot (n+1))/2)$

### Interest rate to be charged by an investor to achieve an expected rate of return on self amortising loan, all discounted

**R** = expected return

**d** = discount rate

$$r = (1+R) \cdot n - (d_0 + d_1 + d_2 + \dots + d_n) / [(n-0) \cdot d_0 + (n-1) \cdot d_1 + (n-2) \cdot d_2 + \dots + (n-n) \cdot d_n]$$