Important Future value Formulas PDF

Formulas
Examples
with Units

List of 14
Important Future value Formulas

1) Annuity Due for Future Value Formula

Evaluate Formula

Formula

$$FV_{AD} = PMT \cdot \frac{(1 + r)^{n_{Periods}} - 1}{r} \cdot (1 + r)$$

Example

$$129.15 = 60 \cdot \frac{(1 + 0.05)^{2} - 1}{0.05} \cdot (1 + 0.05)$$

2) Annuity Payment using Future Value Formula

Evaluate Formula

Formula

$$PMT_{Annuity} = \frac{FV_A}{\left((1 + r)^{n_{Periods}}\right) - 1}$$

Example

$$561365.8537 = \frac{57540}{\left((1 + 0.05)^{2}\right) - 1}$$

3) Future Value Factor Formula

Evaluate Formula

Formula

$$F_{FV} = (1 + r)^{n_{Periods}}$$

Example

$$1.1025 = (1 + 0.05)^{2}$$

4) Future Value of Annuity Formula

Evaluate Formula

Formula

$$FV_A = \left(\frac{p}{IR \cdot 0.01}\right) \cdot \left(\left(1 + \left(IR \cdot 0.01\right)\right)^{n_{Periods}} - 1\right)$$

Example

$$57540 = \left(\frac{28000}{5.5 \cdot 0.01}\right) \cdot \left(\left(1 + \left(5.5 \cdot 0.01\right)\right)^{2} - 1\right)$$

5) Future Value of Annuity with Continuous Compounding Formula

Evaluate Formula

Formula

$$FV_{ACC} = C_f \cdot \left(\frac{e^{r \cdot n_{Periods}} - 1}{e^{r} - 1} \right)$$

Example

$$3076.9066 = 1500 \cdot \left(\frac{e^{0.05 \cdot 2} - 1}{e^{0.05} - 1} \right)$$

6) Future Value of Growing Annuity Formula

Evaluate Formula

Formula

$$FV_{GA} = II \cdot \frac{(1 + r)^{n_{Periods}} - (1 + g)^{n_{Periods}}}{r - g}$$

Example

$$4140 = 2000 \cdot \frac{(1 + 0.05)^{2} - (1 + 0.02)^{2}}{0.05 - 0.02}$$

7) Future Value of Lumpsum Formula

Evaluate Formula

Formula

$$FV_L = PV \cdot (1 + IR_P)^{n_{Periods}}$$

Example

$$112.36 = 100 \cdot (1 + 0.06)^{2}$$

8) Future Value of Ordinary Annuities and Sinking Funds Formula

Evaluate Formula

Formula

$$FV_O = C_f \cdot \frac{(1 + r)^{n_c} - 1}{r}$$

Example

$$29397.948 = 1500 \cdot \frac{(1 + 0.05)^{14} - 1}{0.05}$$

9) Future Value of Present Sum given Compounding Periods Formula

Evaluate Formula

Formula

$$FV = PV \cdot \left(1 + \left(\frac{\%RoR \cdot 0.01}{C_n} \right) \right)^{C_n \cdot n_{Periods}}$$

Example

$$109.3973 = 100 \cdot \left(1 + \left(\frac{4.5 \cdot 0.01}{11} \right) \right)^{11 \cdot 2}$$

10) Future Value of Present Sum given Number of Periods Formula

Evaluate Formula

Formula

$$FV = PV \cdot \exp\left(\%RoR \cdot n_{Periods} \cdot 0.01 \right)$$

Example

$$109.4174 = 100 \cdot \exp\left(4.5 \cdot 2 \cdot 0.01 \right)$$

11) Future Value of Present Sum given Total Number of Periods Formula

Evaluate Formula

Formula

$$FV = PV \cdot \left(1 + \left(\%RoR \cdot 0.01\right)\right)^{n_{Periods}}$$

Example

$$109.2025 = 100 \cdot \left(1 + \left(4.5 \cdot 0.01\right)\right)^{2}$$

12) Future Value with Continuous Compounding Formula

Evaluate Formula

Formula

$$FV_{CC} = PV \cdot \left(e^{\%RoR \cdot n_{cp} \cdot 0.01}\right)$$

Example

$$114.4537 = 100 \cdot \left(e^{4.5 \cdot 3 \cdot 0.01}\right)$$

13) Growing Annuity Payment using Future Value Formula

Evaluate Formula

Formula

$$PMT_{initial} = \frac{FV \cdot \left(r - g\right)}{\left(\left(1 + r\right)^{n_{Periods}}\right) - \left(\left(1 + g\right)^{n_{Periods}}\right)}$$

Example

$$15942.029 = \frac{33000 \cdot \left(0.05 - 0.02\right)}{\left(\left(1 + 0.05\right)^{2}\right) - \left(\left(1 + 0.02\right)^{2}\right)}$$

14) Number of Periods using Future Value Formula

Evaluate Formula

Formula

$$n_{Periods} = \frac{\ln\left(1 + \left(\frac{FV_A \cdot r}{C_f}\right)\right)}{\ln\left(1 + r\right)}$$

Example

$$21.9491 = \frac{\ln\left(1 + \left(\frac{57540 \cdot 0.05}{1500}\right)\right)}{\ln\left(1 + 0.05\right)}$$

Variables used in list of Future value Formulas above

- **%RoR** Rate of Return
- C_f Cashflow per Period
- C_n Compounding Periods
- F_{FV} Future Value Factor
- **FV** Future Value
- FV_A Future Value of Annuity
- FV_{ACC} FV of Annuity with Continuous Compounding
- FV_{AD} Annuity Due Future Value
- FV_{CC} Future Value with Continuous Compounding
- FV_{GA} Future Value of Growing Annuity
- FV_L Future Value of Lumpsum
- FV_O Future Value of Ordinary Annuity
- **g** Growth Rate
- **II** Initial Investment
- **IR** Interest Rate
- IR_P Interest Rate per Period
- n_c Total Number of Times Compounded
- n_{cp} Number of Compounding Periods
- $n_{Periods}$ Number of Periods
- **p** Monthly Payment
- **PMT** Payment made in Each Period
- $PMT_{Annuity}$ Annuity Payment
- $PMT_{initial}$ Initial Payment
- **PV** Present Value
- **r** Rate per Period

Constants, Functions, Measurements used in list of Future value Formulas above

- constant(s): **e**, 2.71828182845904523536028747135266249
  Napier's constant
- Functions: **exp**, exp(Number)
  n an exponential function, the value of the function changes by a constant factor for every unit change in the independent variable.
- Functions: **ln**, ln(Number)
  The natural logarithm, also known as the logarithm to the base e, is the inverse function of the natural exponential function.

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