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Future value Formulas

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List of 14 Future value Formulas

Future value

1) Annuity Due for Future Value

Open Calculator

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

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

2) Annuity Payment using Future Value

Open Calculator

$$PMT_{Annuity} = \frac{FV_A}{((1+r)^{n}\_\{Periods\}) - 1}$$

$$561365.9 = \frac{57540}{\left((1+0.05)^{2}\right) - 1}$$

3) Future Value Factor

Open Calculator

$$F_{FV} = (1+r)^{n}\_\{Periods\}$$

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

4) Future Value of Annuity

Open Calculator

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

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

5) Future Value of Annuity with Continuous Compounding

Open Calculator

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

ex $$3076.907 = 1500 \cdot \left(\frac{e^{0.05 \cdot 2} - 1}{e^{0.05} - 1}\right)$$

6) Future Value of Growing Annuity

Open Calculator

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

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

7) Future Value of Lumpsum

Open Calculator

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

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

8) Future Value of Ordinary Annuities and Sinking Funds

Open Calculator

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

ex $$29397.95 = 1500 \cdot \frac{(1+0.05)^{14}-1}{0.05}$$

9) Future Value of Present Sum given Compounding Periods

Open Calculator

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

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

10) Future Value of Present Sum given Number of Periods

Open Calculator

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

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

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

Open Calculator

fx $$FV = PV \cdot (1+(\%RoR \cdot 0.01))^{n} \_ \{Periods\}$$

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

12) Future Value with Continuous Compounding

Open Calculator

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

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

13) Growing Annuity Payment using Future Value

Open Calculator

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

ex $$15942.03 = \frac{33000 \cdot (0.05 - 0.02)}{\left((1 + 0.05)^{2}\right) - \left((1 + 0.02)^{2}\right)}$$

14) Number of Periods using Future Value

Open Calculator

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

ex $$21.94906 = \frac{\ln\left(1 + \left(\frac{57540 \cdot 0.05}{1500}\right)\right)}{\ln(1 + 0.05)}$$

Variables Used

- **%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

- Constant: **e**, 2.71828182845904523536028747135266249
  Napier's constant
- Function: **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.
- Function: **ln**, ln(Number)
  The natural logarithm, also known as the logarithm to the base e, is the inverse function of the natural exponential function.

Check other formula lists

- **Basics of Time Value of Money Formulas**
- **Future value Formulas**
- **Present value Formulas**

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