

# Important Basics of Time Value of Money Formulas PDF



## Formulas Examples with Units

## List of 10 Important Basics of Time Value of Money Formulas

### 1) Annuity Due Payment using Future Value Formula ↻

Formula

$$P_D = \frac{FV \cdot \frac{r}{(1+r)^t} - 1}{1+r}$$

Example

$$3291.257 = \frac{33000 \cdot \frac{0.05}{(1+0.05)^8} - 1}{1+0.05}$$

Evaluate Formula ↻

### 2) Doubling Time Formula ↻

Formula

$$DT = \log_{10} \frac{2}{\log_{10} \left( 1 + \frac{\%RoR}{100} \right)}$$

Example

$$15.7473 = \log_{10} \frac{2}{\log_{10} \left( 1 + \frac{4.5}{100} \right)}$$

Evaluate Formula ↻

### 3) Doubling Time (Continuous Compounding) Formula ↻

Formula

$$DT_{CC} = \frac{\ln(2)}{\frac{\%RoR}{100}}$$

Example with Units

$$15.4033 \text{ Year} = \frac{\ln(2)}{\frac{4.5}{100}}$$

Evaluate Formula ↻

### 4) Doubling Time (Simple Interest) Formula ↻

Formula

$$DT_{SI} = \frac{100}{\%i}$$

Example with Units

$$14.2857 \text{ Year} = \frac{100}{7}$$

Evaluate Formula ↻

### 5) Hamada Equation Formula ↻

Formula

$$\beta_L = \beta_{UL} \cdot \left( 1 + (1 - T\%) \cdot R_{D/E} \right)$$

Example

$$272.16 = 7.2 \cdot \left( 1 + (1 - 0.08) \cdot 40 \right)$$

Evaluate Formula ↻

### 6) Number of Periods Formula ↻

Formula

$$n_{\text{periods}} = \frac{\ln\left(\frac{FV}{PV}\right)}{\ln(1+r)}$$

Example

$$118.8578 = \frac{\ln\left(\frac{33000}{100}\right)}{\ln(1+0.05)}$$

Evaluate Formula ↻



## 7) Perpetuity Payment Formula

Formula

$$PMT_{\text{perpetuity}} = PV \cdot r$$

Example

$$5 = 100 \cdot 0.05$$

Evaluate Formula 

## 8) Perpetuity Yield Formula

Formula

$$Y = \frac{PMT_{\text{perpetuity}}}{PV}$$

Example

$$0.05 = \frac{5}{100}$$

Evaluate Formula 

## 9) Rule of 69 Formula

Formula

$$DT = \frac{69}{i}$$

Example

$$3.45 = \frac{69}{20}$$

Evaluate Formula 

## 10) Rule of 72 Formula

Formula

$$\text{Rule of 72} = \frac{72}{i}$$

Example

$$3.6 = \frac{72}{20}$$

Evaluate Formula 



## Variables used in list of Basics of Time Value of Money Formulas above

- **%i** Annual Interest Rate
- **%RoR** Rate of Return
- **DT** Doubling Time
- **DT<sub>CC</sub>** Doubling Time Continuous Compounding (Year)
- **DT<sub>SI</sub>** Doubling Time Simple Interest (Year)
- **FV** Future Value
- **i** Rate of Interest as Whole Number
- **n<sub>Periods</sub>** Number of Periods
- **P<sub>D</sub>** Annuity Payment Due
- **PMT<sub>perpetuity</sub>** Perpetuity Payment
- **PV** Present Value
- **r** Rate per Period
- **R<sub>D/E</sub>** Debt to Equity (D/E)
- **Rule of 72** Rule of 72
- **t** Total Number of Periods
- **T<sub>%</sub>** Tax Rate
- **Y** Perpetuity Yield
- **β<sub>L</sub>** Leveraged Beta
- **β<sub>UL</sub>** Unleveraged Beta

## Constants, Functions, Measurements used in list of Basics of Time Value of Money Formulas above

- **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.*
- **Functions:** **log10**, **log10(Number)**  
*The common logarithm, also known as the base-10 logarithm or the decimal logarithm, is a mathematical function that is the inverse of the exponential function.*
- **Measurement:** **Time** in Year (Year)  
Time Unit Conversion 



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