

## A. Basic Calculations and Ratios

### 1) Format of Income Statement (IS)

Particulars	Amount
Revenue	xxx
(-) COGS	(xx)
GP	xxx
(-) Admin & general Exp	xx
(-) Mktg & selling Exp	xx
EBITDA	xxx
(-) Dep <sup>n</sup> & Amort <sup>n</sup>	(xx)
EBIT / operating profit	xxx
(-) Interest	(xx)
EBT or PBT	xxx
(-) Tax	(xx)
EAT or PAT or <sup>net</sup> profit	xxx
(-) Preference Dividend	(xx)
Earnings Available to ES	xxx [EAES]
(-) Equity Dividend	(xx)
Retained Earnings	xxx

*operating cost* (bracketed next to COGS, Admin & general Exp, Mktg & selling Exp, Dep<sup>n</sup> & Amort<sup>n</sup>)

*GP margin* (dashed red arrow from Revenue to GP)

*EBIT or op. profit margin* (dashed pink arrow from Revenue to EBIT)

*net profit margin* (dashed green arrow from Revenue to EAT)

**Equation of PAT:**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## 2) Earnings Per Share

**Earnings Per Share (EPS)**

$$= \frac{\text{EAES / PAT}}{n}$$

$n$  = Number of equity shares

In the absence of preference dividend, EAES = PAT.

IS extract:

Particulars	Amount
PAT	XXX
(-) Pref. Div	XX
EAES	XXX

## 3) Book Value Per Share

**Book-value per Share (BVPS)** is the per share value of equity shareholders in the net assets of the company as per books or balance sheet.

$$\frac{\text{ESHF}}{n}$$

**Equity Shareholders Funds (ESHF) or Net Worth** is the total value of equity shareholders in the net assets of the company as per books or Balance Sheet.

$$\text{Equity share Capital} + \text{R \& S (PIL (x. Bal.))} - \text{misc. or Fictitious \& Exp Asset}$$

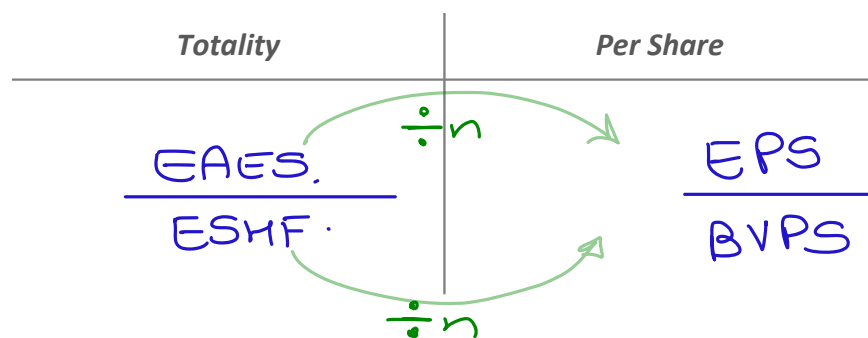
PIL Dr. Bal

$$\text{All assets (excluding fic Assets \& PIL Dr. Balance)} - \text{outside liability. - preference claim.}$$

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## 4) Return on Equity

**Return on Equity (ROE)** is the return (profit) earned by the company on the capital of equity shareholders as per books or balance sheet.

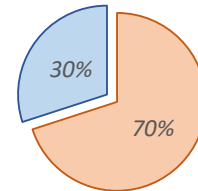


### 5) Market Price per Share & Market Capitalization

**Market Price per Share (MPS)** is the price at which share trades in the market. It tells you the value per share in the market.

**Market Capitalisation (M-Cap)** means total market value of equity shares of the company.

Example: Justdial Ltd has 1000 equity shares outstanding.  
Current market price is ₹ 15 per share.



Shareholding Pattern	No. Of shares	Holding %
Promoters	700	70%
General Public	300	30%

Total or Full Market Cap	Free-float Market Cap
It is the total market value of all equity shares of the company.	It is that part of total market cap that is not held by promoters i.e., held by general public

Calculation of M-Cap	
$= \text{MPS} \times n$ $= 15 \times 1000$ $= ₹ 15000$	$= \text{MPS} \times \text{Free float } n$ $= 15 \times 300$ $= ₹ 4500$
	$= \text{Total m-Cap} \times \% \text{ holding}$ $= ₹ 15000 \times 30\%$ $= ₹ 4500$

**ESHF vs M-cap or BVPS vs MPS:**

	Totality Value	Per Share Value
As per market	m-cap.	MPS
As per books	ESHF	BVPS.

## 6) MPS & Price Earnings Ratio

**Price Earnings Ratio (PE Ratio):** It tells you 'How many times are the investors ready to pay for every rupee of income earned from the share of a company'. And a lot more...

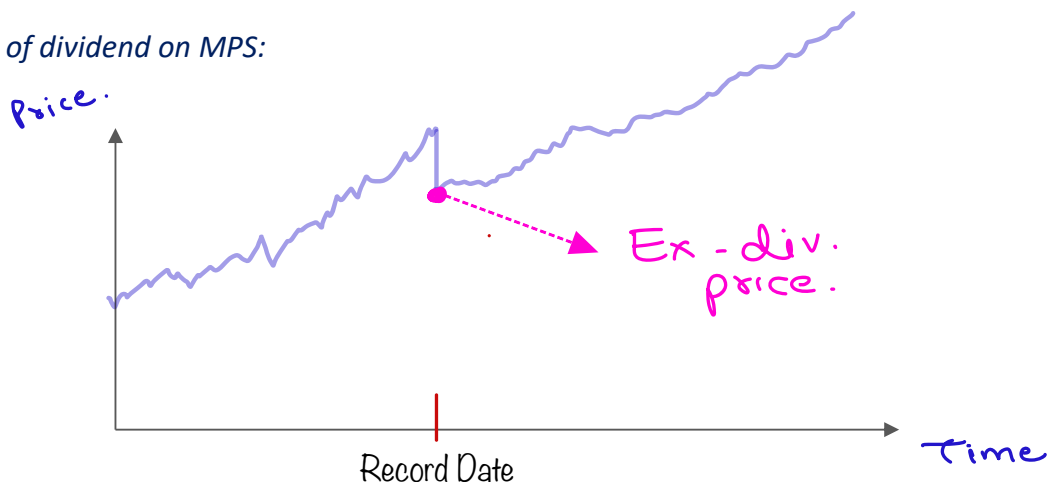
Accordingly, **Market Price Per Share (MPS):**

## 7) Dividend: Absolute & Percentage

**Dividend Per Share (DPS):**  $\frac{\text{Total dividends}}{n}$

Dividend Rate (as a % of FV)	Dividend Yield (as a % of MPS)	Payout Ratio (as a % of EPS)	Retention Ratio
$: \frac{DPS}{FV.}$ <p>or</p> $FV \times \text{Div rate} = DPS.$	$\frac{DPS}{MPS}$	$\frac{DPS}{EPS.}$ <p>↓</p> <p>Payout Ratio</p>	$\frac{RE}{EPS.}$ <p>↓</p> <p>Retention Ratio = 100%</p>

Impact of dividend on MPS:



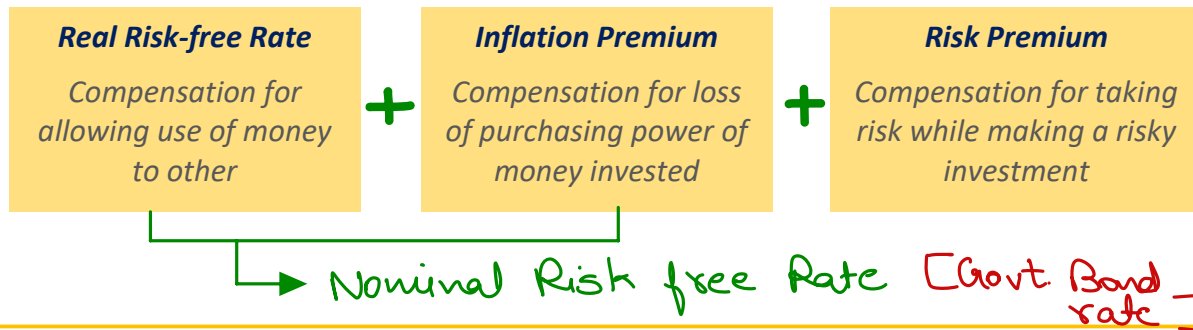
"Yield" is the return, always based on market price.

8) Other ratios used in practical questions:


## B. Different Types of Rates of Return

### 1) Required Rate of Return

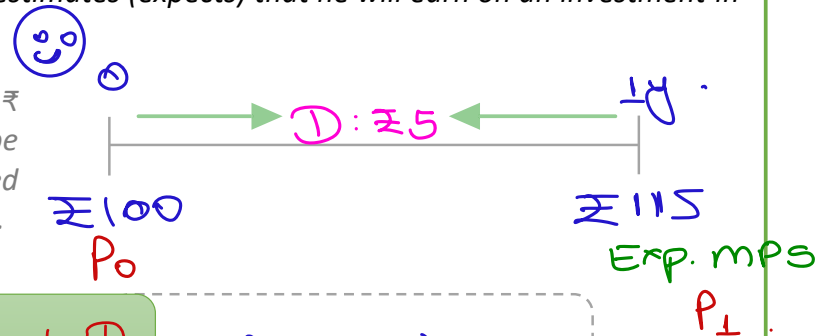
It is the minimum rate of return required to be earned from an investment based on the risk involved in it. Also called as Opportunity Cost, it is used as discounting rate to calculate PV of CFs.



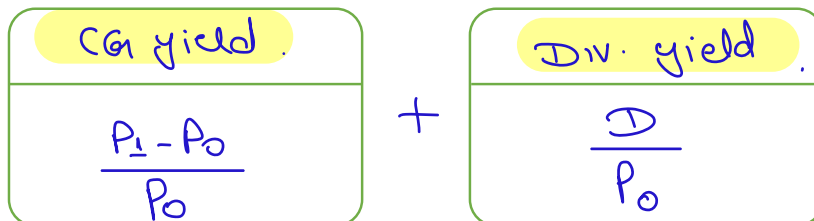
### 2) Expected Rate of Return

It is the rate of return that an investor estimates (expects) that he will earn on an investment in a period of 1 year.

Example: A share is bought today @ ₹ 100 and investor estimates that it can be sold @ ₹ 115 after a year. Then, expected rate of return on the investment is 15%.



$$E(R) : \frac{P_1 - P_0 + D}{P_0} = \frac{(115 - 100) + 5}{100}$$



### 3) Internal Rate of Return (Technique)

It is the discounting rate at which PV of cash inflows from an investment is equals to initial cash outflow. It is calculated to determine the compounded rate of return actually earned (in case of ex-post data) or to be earned (in case of ex-ante data) on any investment.

Example:

Years	CFs (₹)	
0	-100	0
1	60	1
2	70	2

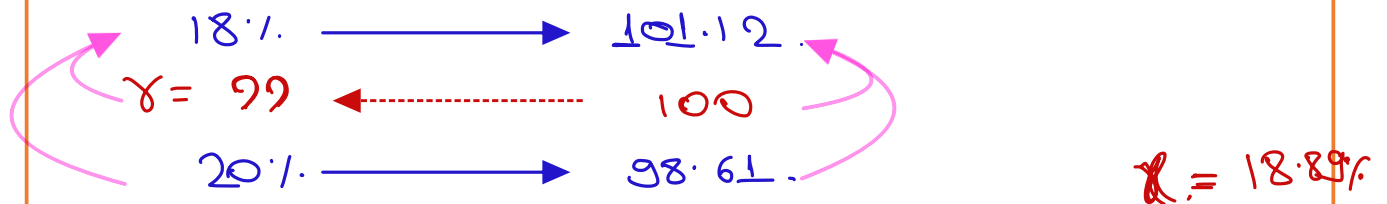
Timeline diagram showing cash flows: PV(CO) = 100 at year 0, 60 at year 1, and 70 at year 2. Arrows indicate discounting back to year 0 at rate r?

First, we use **trial & error method** to find the PV of future cash inflows at different rates:

$$100 = \frac{60}{(1+r)^1} + \frac{70}{(1+r)^2}$$

∴ r =	Then PV(CI) =
18%	₹ 101.12
20%	₹ 98.61

Then, we use **Interpolation** to find precise IRR:



$$r = \frac{100 - 101.12}{98.61 - 101.12} \times (20 - 18) + 18 = 18.89\%$$

Let's verify the return earned:

Year	Amount Invested	Return Accrued	Return received	Due Amount
0	100			
1		18.89	60	78.89
2		18.89	70	97.78

## C. Time Value of Money

### 1) Interest Rate & Compounding Frequency Interpretations:

<i>Percentage &amp; Decimal</i>	
$r = 10\%$	
$r = 10\% \text{ p.a.}$	
<ul style="list-style-type: none"><li>• <i>Annually Compounded</i></li></ul>	
<ul style="list-style-type: none"><li>• <i>Semi-annually Compounded</i></li></ul>	
<ul style="list-style-type: none"><li>• <i>Continuously Compounded</i></li></ul>	
$r = 5\% \text{ per for 6 months}$	
<i>One month rate is 10%</i>	





## 2) Present Value & Future Value Calculations

Example:

<i>Periods:</i>	1	2	3	4
<i>Cash Flows (₹)</i>	200	200	200	200

Interest Rate = 10%

<i>Future Value</i>	<i>Present Value</i>
<b>Single Sum</b>	
<i>FV of ₹ 200 of today at the end of 4th year:</i>	<i>PV today of ₹ 200 of 4<sup>th</sup> year end:</i>
<i>FV of ₹ 200 of today at the end of 4th semi-annual period:</i>	<i>PV today of ₹ 200 of 4<sup>th</sup> semi-annual period end:</i>

**Annuity (A)**

**Regular Annuity:** Assumes CF at the end of the period

FV of all CFs at the end of 4<sup>th</sup> year:

PV of all CFs today:

**Annuity Due:** Assumes CF at the start of the period

FV of all CFs at the end of 4<sup>th</sup> year:

PV of all CFs today:

**Perpetuity:** Assumes everlasting CFs

FV of infinite CFs of ₹ 200 at the end of period:

PV of infinite CFs of ₹ 200 today:

## D. Types of Cash Flows

### 1) Calculation of Cash Flow After Tax (CFAT)


### 2) Nominal vs Real Cashflows

<i>Estimated Units Sales</i>	
<i>Price (without inflation)</i>	
<i>Price (with inflation)</i>	

<i>Nominal Cash Flows</i>	<i>Real Cash Flows</i>
<i>Nominal CFs are the actual CFs the company expects to receive or pay in future with the effect of inflation included in it.</i>	<i>When effect of inflation is removed from such future CFs, they are called Real CFs. It does not have effect of inflation included in it.</i>
<i>Relationship between Nominal cash flow and Real cash flow:</i>	
<i>To calculate PV of nominal CFs, nominal discounting rate is used.</i>	<i>To calculate PV of real CFs, real discounting rate is used.</i>
<i>Relationship between Nominal and Real discounting rate:</i>	

Example: Cipla Ltd has forecasted cash inflow of ₹ 100 crores to be received at the end of 2<sup>nd</sup> year. Real discounting rate is 10% and inflation in the economy is at 5%. Calculate PV of future cash flow using Nominal discounting rate and Real discounting rate.

Using Nominal discounting rate:

Using Real discounting rate:

Recollect that required rate of return has three components:

**Real Risk-free Rate**

Compensation for allowing use of money to other

**Inflation Premium**

Compensation for loss of purchasing power of money invested

**Risk Premium**

Compensation for taking risk while making a risky investment

Appropriate rate to be used to discount respective CFs:

	Real Cash Flows	Nominal Cash Flows
Risk-free Cash Flows		
Risky Cash Flows		

## E. Some Exam Tips and Maths Tricks

### 1) Rounding-off rules

If the number being calculated naturally has only 2, 3 or 4 digits after decimal point, then there is no need to round off and continue with the same number in the solution.

However, if there are many digits after the decimal point, then there is a need of round-off:

1. If the number is too small (say EPS or DPS = ₹ 0.246529...), then you may consider it till four decimal points.
2. In all other cases, then round-off to below number of digits after decimal points:

2	<p>Any % like <math>K_e</math>, <math>R_F</math>, <math>E(R)</math>, <math>\sigma</math>, <math>\sigma^2</math>, <math>RoE</math>, <math>\alpha</math>, <math>CV</math>, Treynor's Ratio, etc.</p> <p>Weights &amp; probabilities (if in %)</p> <p>Mutual Fund Units &amp; NAV</p> <p>Amounts not in Lakhs, million or crore</p> <hr/>
3	<p>Beta (<math>\beta</math>)</p> <p>Correlation (<math>r</math>)</p> <p>PVF &amp; FVF</p> <p>Duration (Macaulay's &amp; Modified)</p> <p>Exchange Ratio (M&amp;A)</p> <hr/>
4	<p>Weights &amp; probabilities (if in decimals)</p> <p>Foreign Exchange Rate (unless question has some other flow)</p> <p>Binomial model: <math>u</math> &amp; <math>d</math></p> <p>Black-Scholes Model: <math>d1</math>, <math>d2</math>, <math>N(d1)</math>, <math>N(d2)</math></p> <p>Mutual Fund NAV (if to be used for further calculations)</p> <p>Amount in Lakhs, million or crore</p> <hr/>

**Note:** Please note that these are not official rules by institute, but is my observation of what institute has done in most of its practical questions.

## 2) Day Counting Rules

We need to count the 'Number of Days ( $n$ )' to be used in calculation in topics like Money Market Instruments, Derivatives, Mutual Funds, etc.

- ✓ **If question doesn't specify dates:** Do calculation in months (like  $n/12$ )
- ✓ **If question specifies dates:** Do calculation in days (like  $n/365$ )

Now we learn how to calculate the ' $n$ ' through below example of holding periods:

15 Nov – 15 Jan	
31 Oct – 15 Jan	
1 Nov – 15 Jan	

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## 3) Maths related to $e^x$

Value of  $e^x$  is mostly given in the question. If not given, calculate it as:

$$\frac{1}{e^x} = e^{-x}$$

$$e^x = \frac{1}{e^{-x}}$$

$$\frac{e^x}{e^y} = e^{x-y}$$

#### 4) Dirty Power Calculation

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