📘 User Manual: Investment Metrics Explained

Net Present Value (NPV)

Think of NPV as: “How much is this stream of future profits worth today?”

• NPV > 0 → the investment is profitable

• NPV = 0 → the IRR is the return rate

• NPV < 0 → you’re losing money

📊 Formula:

NPV = $\sum CF_t / (1 + r)^t$ - Initial Investment

Internal Rate of Return (IRR)

☑️ Definition: Annualized return rate where NPV = 0

📊 Formula: Use numpy or a financial calculator:

np.irr([-Initial Investment, CF1, CF2, ...])

Return on Investment (ROI)

📈 Definition: Total return relative to initial capital.

📊 Formula:

ROI = (Total Return / Initial Investment) × 100

ROI includes:

• Appreciation

• Mortgage principal paydown

• Net profit at sale

Cash-on-Cash Return (CoC)

💵 Definition: Measures the annual pre-tax cash flow relative to the initial cash invested.

📊 Formula:

CoC = (Annual Pre-Tax Cash Flow / Initial Cash Invested) × 100

📌 Example:

You put $40,000 down on a rental property and receive $3,600 in annual cash flow:

CoC Return = ($3,600 / $40,000) × 100 = 9%

📑 Monthly Expenses

This includes recurring costs like:

• 🏠 Property Taxes

• 🛡️ Home Insurance

• 🧰 Maintenance & Repairs

• 🏢 HOA Fees

• 💬 Miscellaneous Operating Costs

🧠 Tip: If unsure of monthly expenses, estimate as 25% of rent. Typical operating costs include:

• Property taxes

• Insurance

• Repairs & maintenance

• Vacancy buffer

• HOA fees or other recurring expenses

💡 Example: If your rent is $2,000/month, typical expenses might be 25% or ~$500/month.

Multi-Year Cash Flow & ROI

💵 Cash Flow = Annual Rent – (Operating Expenses + Mortgage Payments)

📈 ROI = (Total Return / Initial Investment) × 100

📑 What Counts as Cash Flow for CoC and ROI?

Cash-on-Cash Return uses Net Pre-Tax Cash Flow — not total rent.

📊 Formula:

Cash Flow = Annual Rent – (Operating Expenses + Mortgage Payments)

🎯 When CoC = ROI (Year 1):

If there is no appreciation, mortgage paydown, or sale value yet, ROI = CoC.

But ROI becomes more powerful long-term, factoring in gains like:

• Equity from price appreciation

• Mortgage principal reduction

• Sale value of property

📊 Long-Term Metrics

■ IRR (%) – Internal Rate of Return

Definition Recap: IRR is the annualized rate where NPV of all cash flows becomes zero.

■ Example:

You buy a rental with a $40,000 down payment.

Each year you receive $3,600 in cash flow.

After 5 years, you sell and receive $60,000 net profit.

🧮 Python Code:

```
import numpy as np
irr = np.irr([-40000, 3600, 3600, 3600, 3600, 3600 + 60000])
print(f"IRR: {irr:.2%}")  # Result: ~17.7%
```

■ IRR ≈ 17.7%

■ Equity Multiple

Definition: How many times your original investment has grown.

📊 Formula:

Equity Multiple = Total Cash Inflows / Total Cash Invested

■ Example:

You invest $40,000 and receive $78,000 total (rent + final sale).

Equity Multiple = 78,000 / 40,000 = 1.95×