

Present Value (PV)

Money **now** is more valuable than money **later on**. Why? Because you can use money to make more money!

You could run a business, or buy something now and sell it later for more, or simply put the money in the bank to earn interest.

Example: You can get 10% interest on your money.

So **\$1,000 now** can earn $\$1,000 \times 10\% = \100 in a year. Your **\$1,000 now** can become **\$1,100 in a year's time**.

Present Value

So \$1,000 now is the **same** as \$1,100 next year (at 10% interest).
We say the **Present Value** of \$1,100 next year is **\$1,000**

Because we could turn \$1,000 into \$1,100 (if we could earn 10% interest). Now let us extend this idea further into the future ...

How to Calculate Future Payments

Let us stay with 10% Interest. That means that money grows by 10% every year, like this:

So: **\$1,100 next year** is the same as **\$1,000 now**.

- And **\$1,210 in 2 years** is the same as **\$1,000 now**.
- etc

Suppose the interest rate $r = 0.10$ (ten percent).

If we invest \$100 at 10% per year then we get \$110 in one year, or the present value of \$110 a year from now is \$100 today.

Future Value = Present Value * $(1 + r)$. Thus, the $PV = FV / (1 + r)$.

Calculating the present value is called discounting.

Now invest \$100 at 10% per year for two years:

$\$100 \times (1 + 0.10) = \110 and $\$110 \times (1 + 0.10) = \121 . So the Future Value is $PV \times (1 + r)^2$ and the $PV = FV / (1 + r)^2$.

If we have n periods then $FV = PV(1+r)^n$ And $PV = FS / (1 + r)^n$