

Time Value of Money

Future Value- Amount to which an investment will grow after earning interest.

Compound Interest- Interest earned on interest.

Simple Interest- Interest earned only on the original investment.

Example: Simple Interest

Interest earned at a rate of 6% for five years on a principal balance of \$100.

Interest earned per year = $\$100 \times .06 = \6

Example: Compound Interest

Interest earned at a rate of 6% for five years on the previous year's balance.

Today	1	2	3	4	5
Interest earned	6	6.36	6.74	7.15	7.57
Value 100	106	112.36	119.10	126.25	133.82

Value at the end of year 5 133.82

Present Value- Value today of a future cash flow.

Example: Present Value

You just bought a new computer for \$3,000. The payment terms are 2 years same as cash. If you can earn 8% on your money, how much money should you set aside today in order to make the payment when due in 2 years?

Calculator **N**=number of periods **I/Y**= interest rate **PV**= present value **PMT**=payment **FV**=future value

N= 2, I/Y=8, PMT=0, FV=3000, PV=?

PV=2572.02

Present Value of Multiple Cash Flows

Example:

Your auto dealer gives you the choice to pay \$15,500 cash now, or to make three payments: \$8,000 now and \$4,000 at the end of the following two years. If your cost of money is 8%, which do you prefer?

Immediate payment \$8,000.00

$N=1, I/Y=8, PMT=0, FV=4000, PV_1=?$

$PV_1=3703.70$

$N=2, I/Y=8, PMT=0, FV=4000, PV_2=?$

$PV_2=3429.36$

Total PV= $8000 + 3703.70 + 3429.36 = \15133.06

Perpetuity- A stream of level cash payments that never ends.

$PV= c/r$

c=cash payment

r=interest rate

Example:

In order to create an endowment, which pays \$100,000 per year, forever, how much money must be set aside today in the rate of interest is 10%?

$PV= c/r=100,000/.10= \$1,000,000$

If the first perpetuity payment will not be received until three years from today, how much money needs to be set aside today?

$N=3, I/Y=10, PMT=0, FV=1,000,000, PV=?$

$PV=751,314.80$

Annuity-Equally spaced level stream of cash flows for a limited period of time.

Example: Future Value of annual payments

You plan to save \$4,000 every year for 20 years and then retire. Given a 10% rate of interest, what will be the FV of your retirement account?

$N=20, I/Y=10, PV=0, PMT=4000, FV=?$

$FV=229,099.99$