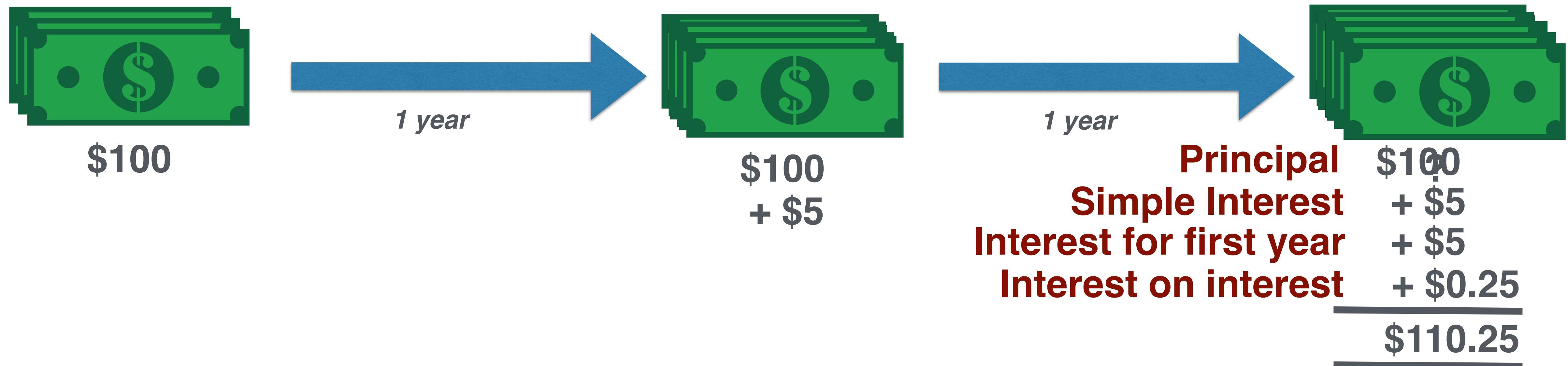




Time Value of Money

Future Value of A Single Cashflow

1. Calculate FV of a single CF
2. Effective Annual Rate
3. Continuous compounding



14000

10500

7000

3500

0

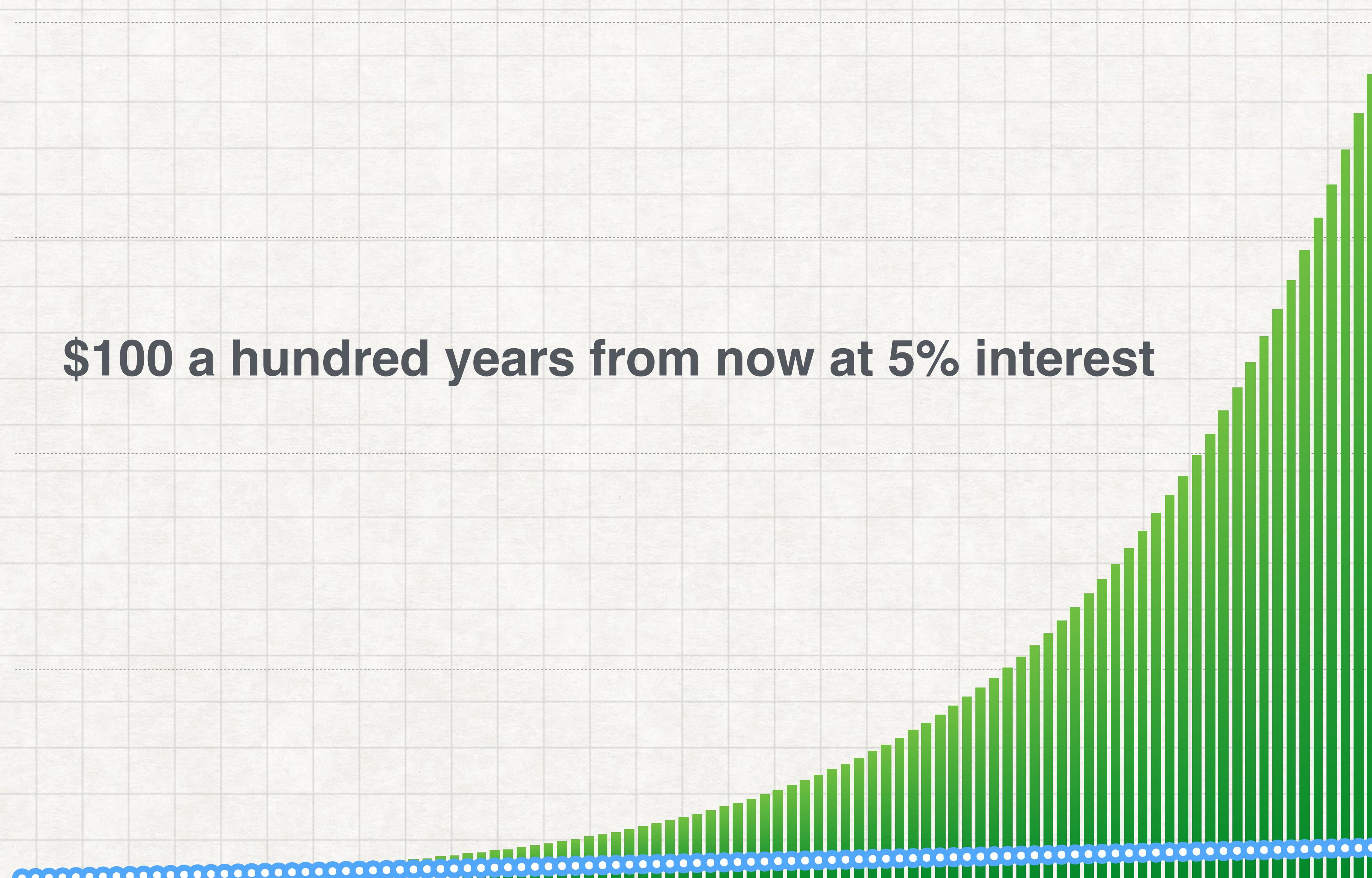
\$100 a hundred years from now at 5% interest

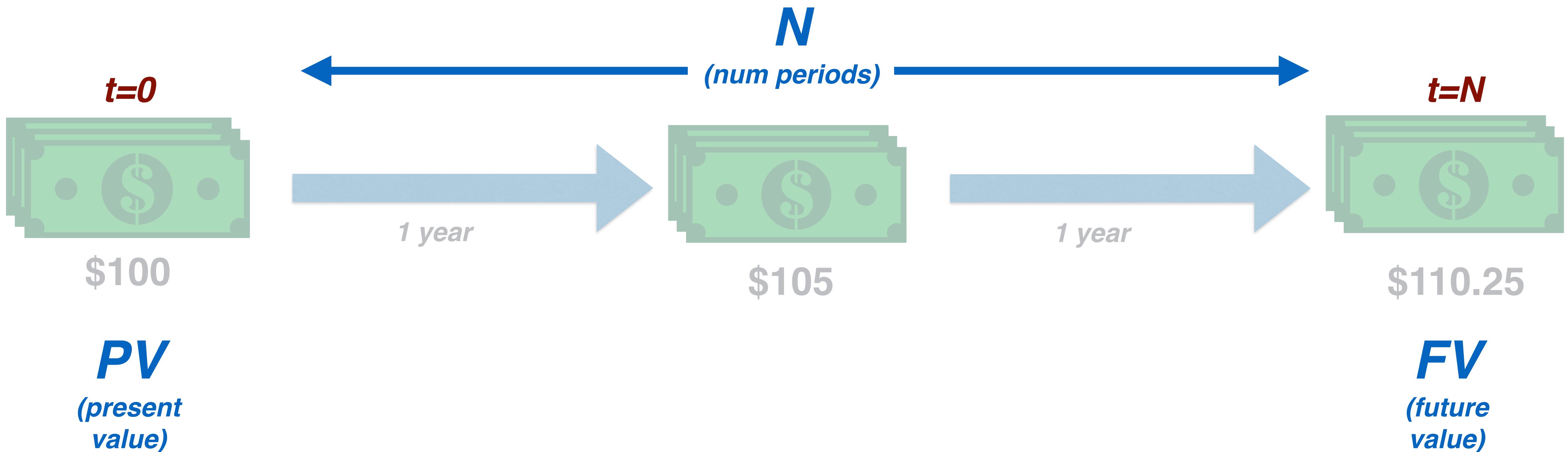
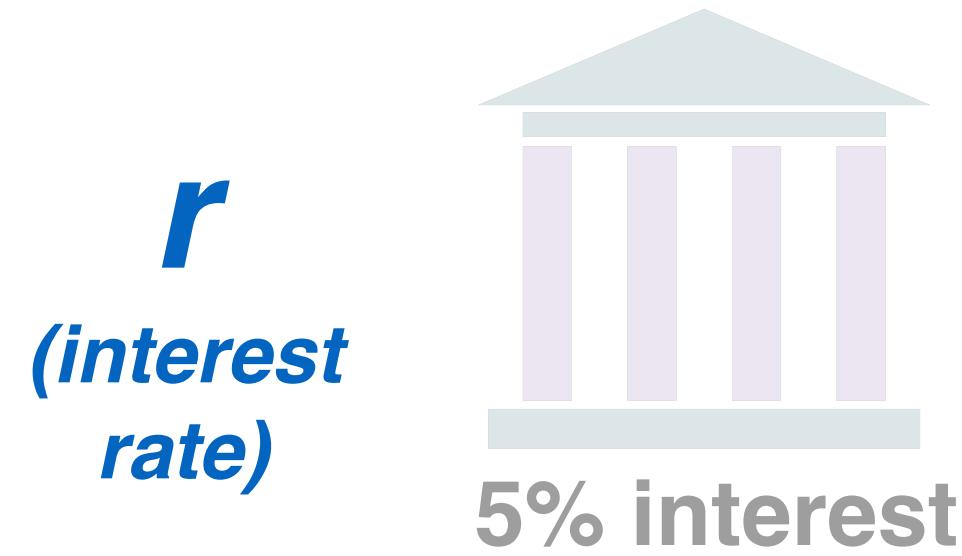
1

100

Compounded
\$13,150

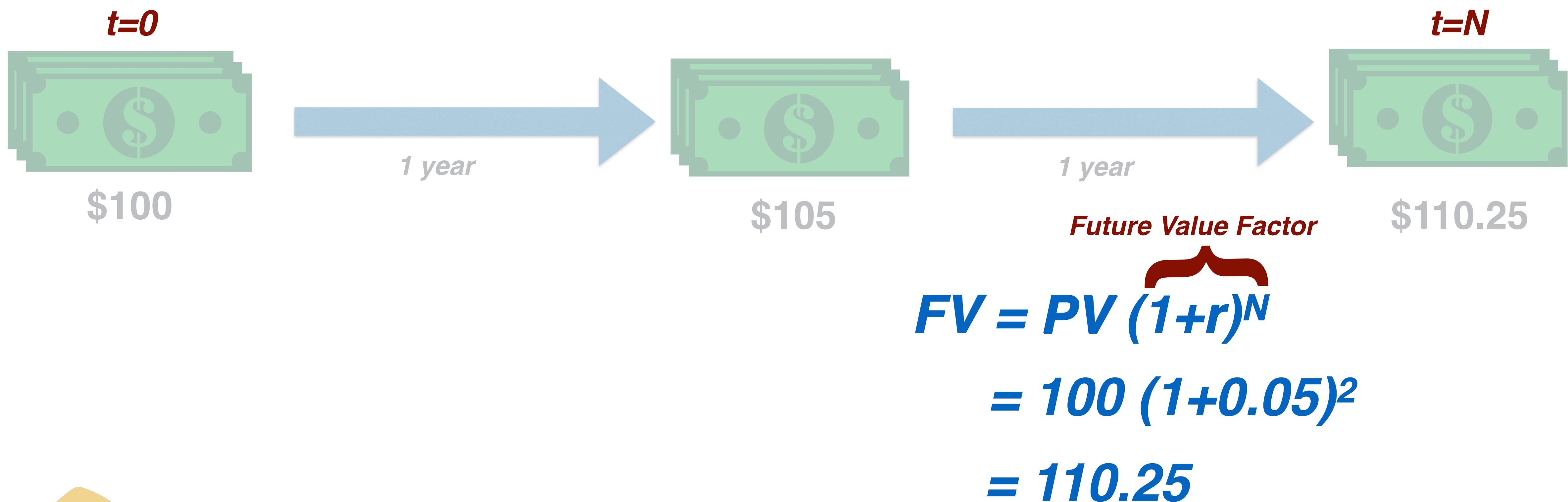
Simple
Interest
\$600



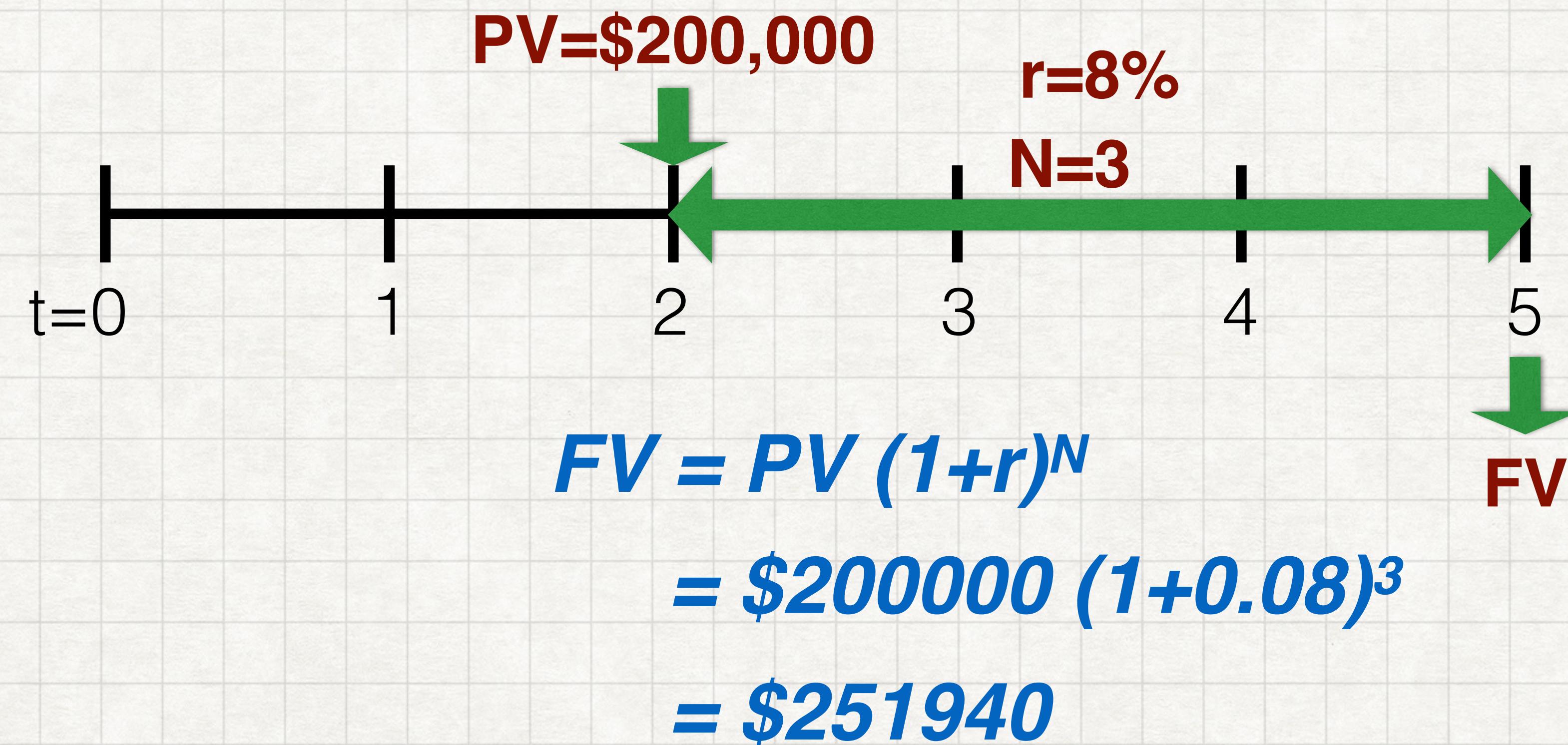


Future Value of A Single Cashflow

1. Calculate FV of a single CF
2. Effective Annual Rate
3. Continuous compounding

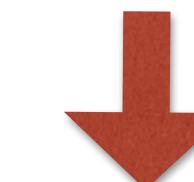


Sharon expects to receive \$200,000 from a matured bond 2 years from now. She would like to place the proceeds into an investment fund which has an expected 8% rate of return per year. How much money can she expect to have in the investment fund 5 years from now?

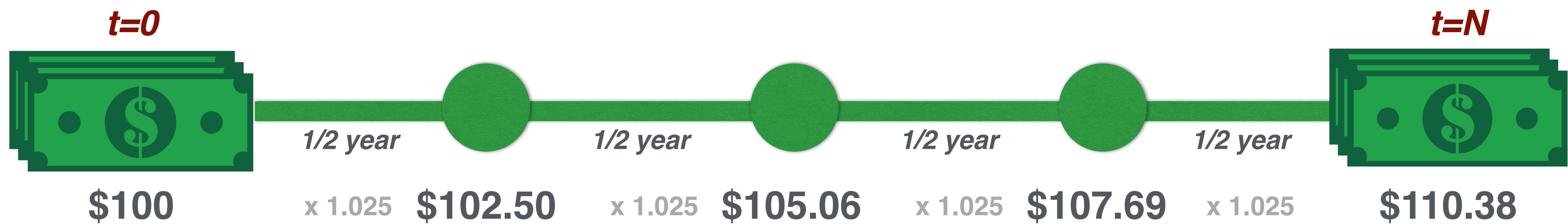




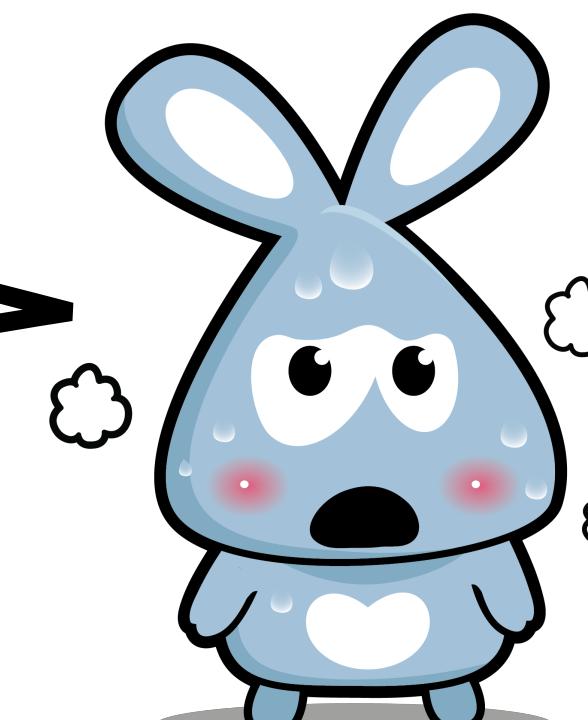
5% interest annual rate



2.5% interest per period



Am I
effectively getting
more than 5%
interest?



$$\begin{aligned}
 FV &= PV (1+r)^N \\
 &= 100 (1+0.025)^4 \\
 &= 110.38
 \end{aligned}$$

≠ \$110.25
(yearly
compounding)

Future Value of A Single Cashflow

Piggy Bank

4.95% p.a

* Interest paid monthly

$$\text{Interest per mth} = 4.95 / 12 = 0.4125\%$$

$$\begin{aligned}\text{Effective Annual Rate} &= (1 + 0.004125)^{12} - 1 \\ &= 0.05064 \\ &= 5.064\%\end{aligned}$$



Porky Bank

5.0% p.a

* Interest paid half yearly

$$\text{Interest per half yr} = 5 / 2 = 2.5\%$$

$$\begin{aligned}\text{Effective Annual Rate} &= (1 + 0.025)^2 - 1 \\ &= 0.05063 \\ &= 5.063\%\end{aligned}$$

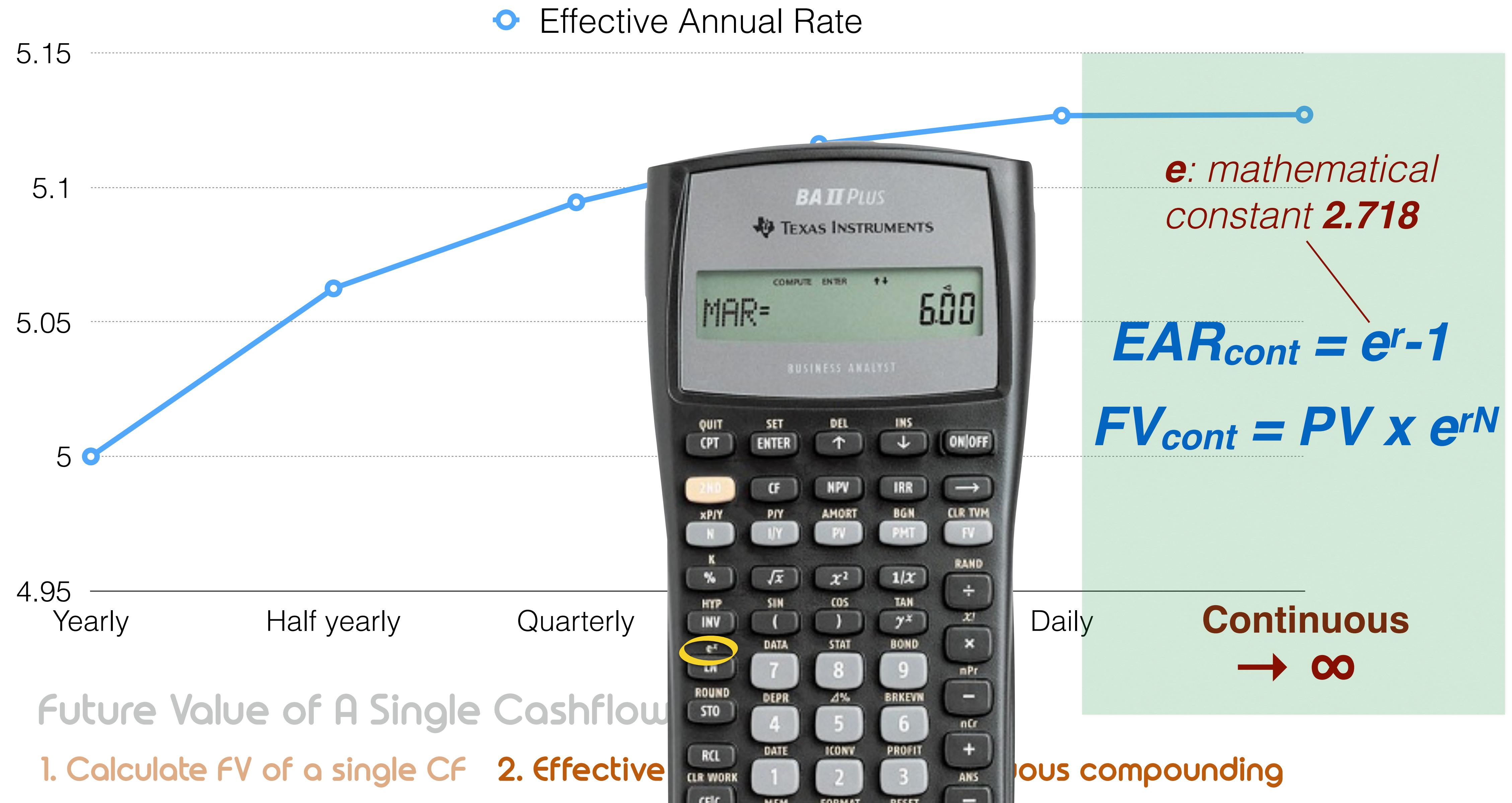
Effective Annual Rate

how much interest is effectively being paid in a whole year

Future Value Factor

$$\text{EAR} = (1+r)^N - 1$$

Effective Annual Rate of quoted 5% interest at varying payout frequencies



Lee placed \$50,000 into an account which practises continuous compounding. The interest per year is a guaranteed 4%. How much total interest can Lee expect to earn by the end of 6 years?

$$FV_{cont} = PV \times e^{rN}$$

$$\text{Total interest earned} = PV \times (e^{rN} - 1)$$

$$= \$50,000 \times (e^{0.04 \times 6} - 1)$$

$$= \$13,562$$

Future Value of A Single Cashflow

1. Calculate FV of a single CF

$$FV = PV (1+r)^N$$

2. Effective Annual Rate

$$EAR = (1+r)^N - 1$$

3. Continuous compounding

$$EAR_{cont} = e^r - 1$$

$$FV_{cont} = PV \times e^{rN}$$

***r* and *N* must correspond to the correct time period!**



prepnuggets.com