Time Value of Money

Series of Cashflows

1. Regular Cashflows
2. TVM Functions
3. Uneven Cashflows

PREP nuggets

5% interest

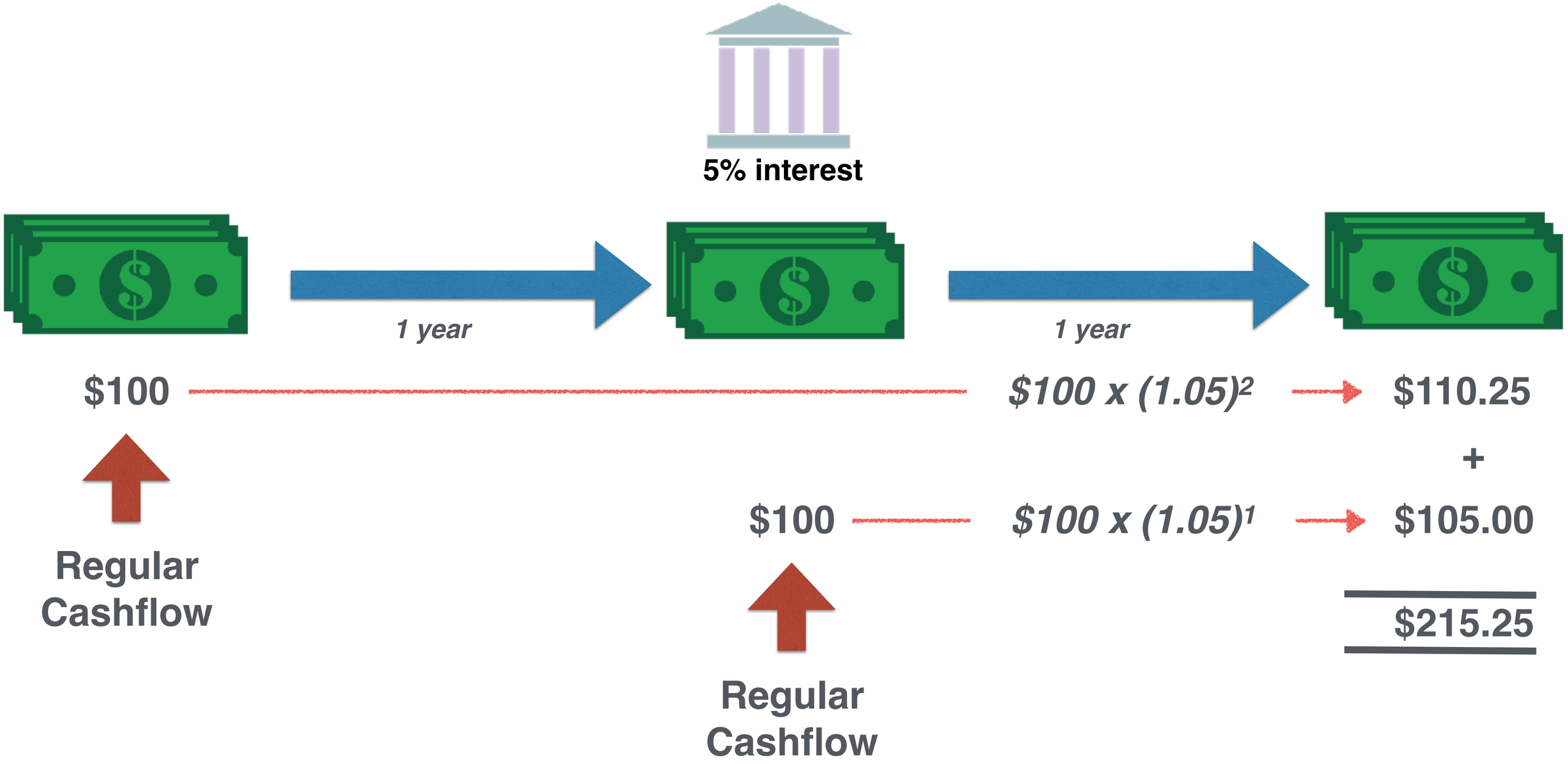
$100 → ***$100 x (1.05)²*** → **$110.25**

Single Cashflow

PREP nuggets

Series of Cashflows

1. Regular Cashflows 2. TVM Functions 3. Uneven Cashflows



PREP nuggets

Series of Cashflows

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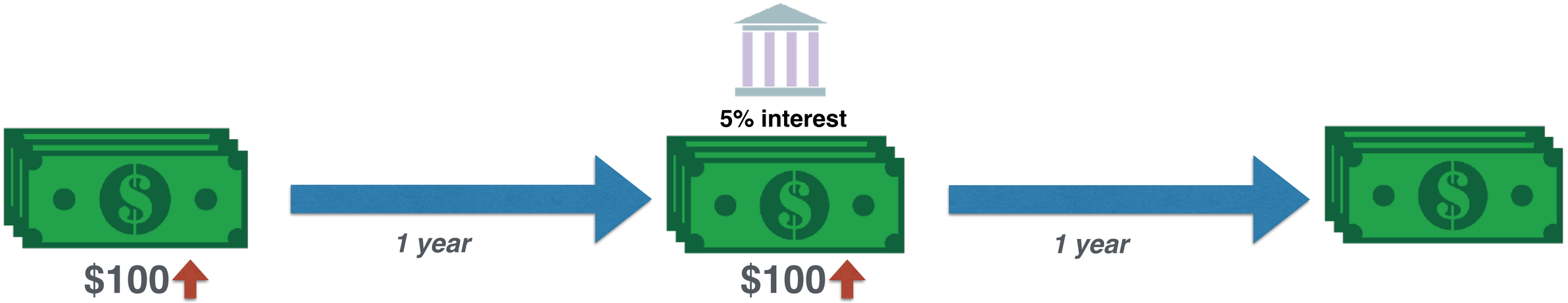

METHOD 1

$\$100 \times (1.05)^2$	$110.25
	+
$\$100 \times (1.05)^1$	$105.00
	$215.25

METHOD 2

$$FV_N = A\left[\frac{(1+r)^N - 1}{r}\right]$$

$$FV_2 = 100\left[\frac{(1+0.05)^2 - 1}{0.05}\right] = 205$$

$$ANS = 205 \times 1.05 = 215.25$$

A: regular cash flow
r: interest rate
N: number of time periods

*Method assumes cash flows made at **end***

Compound by 1 more period

PREP nuggets

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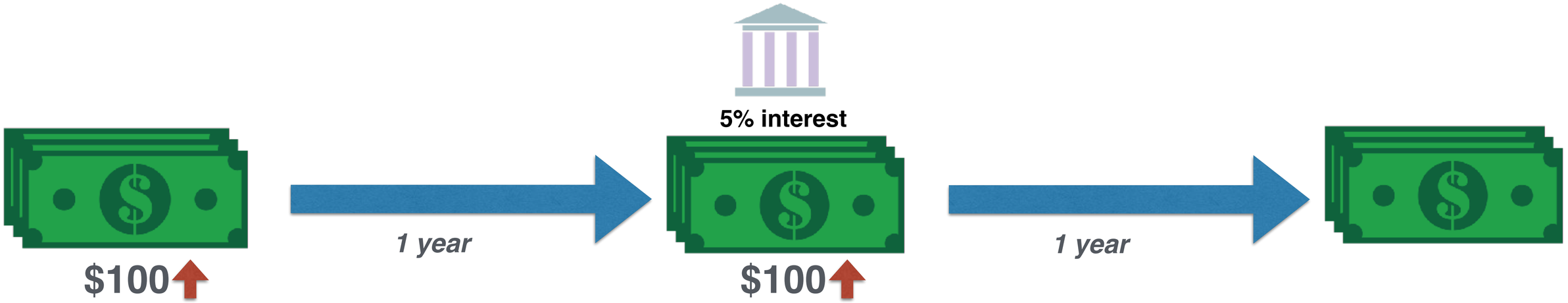

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METHOD 3

PREP nuggets

Series of Cashflows

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-VE

PV

r

N

Money flowing out FROM investor

Money flowing back TO investor

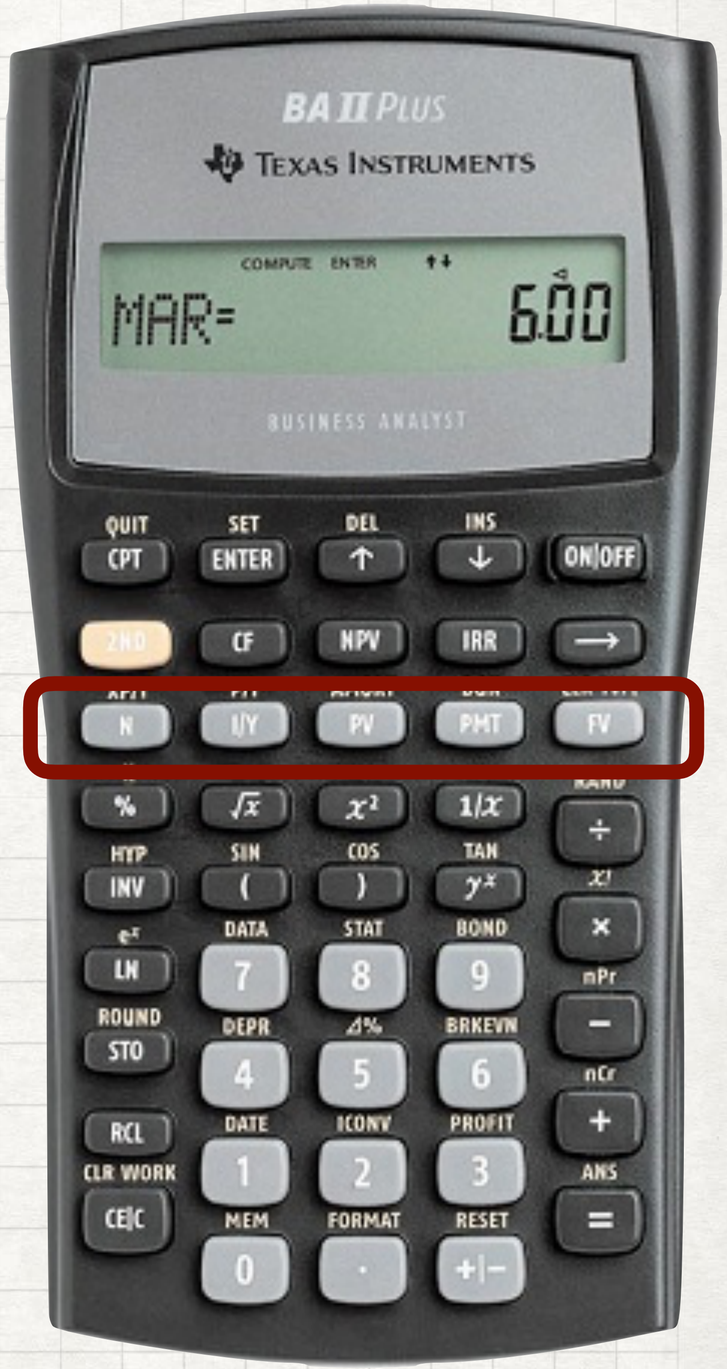
t=0 1 2 3 4 5

PMT

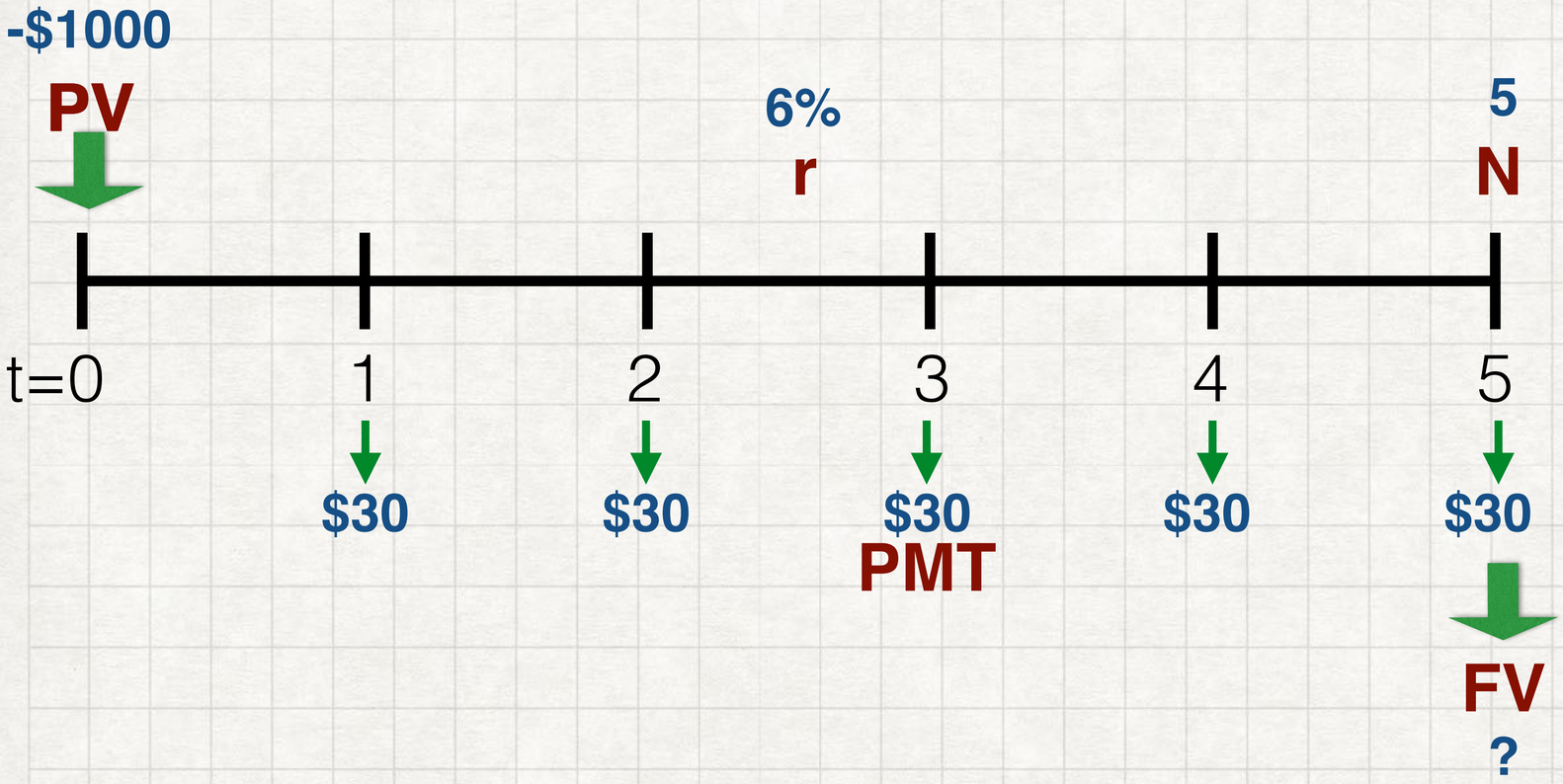
FV

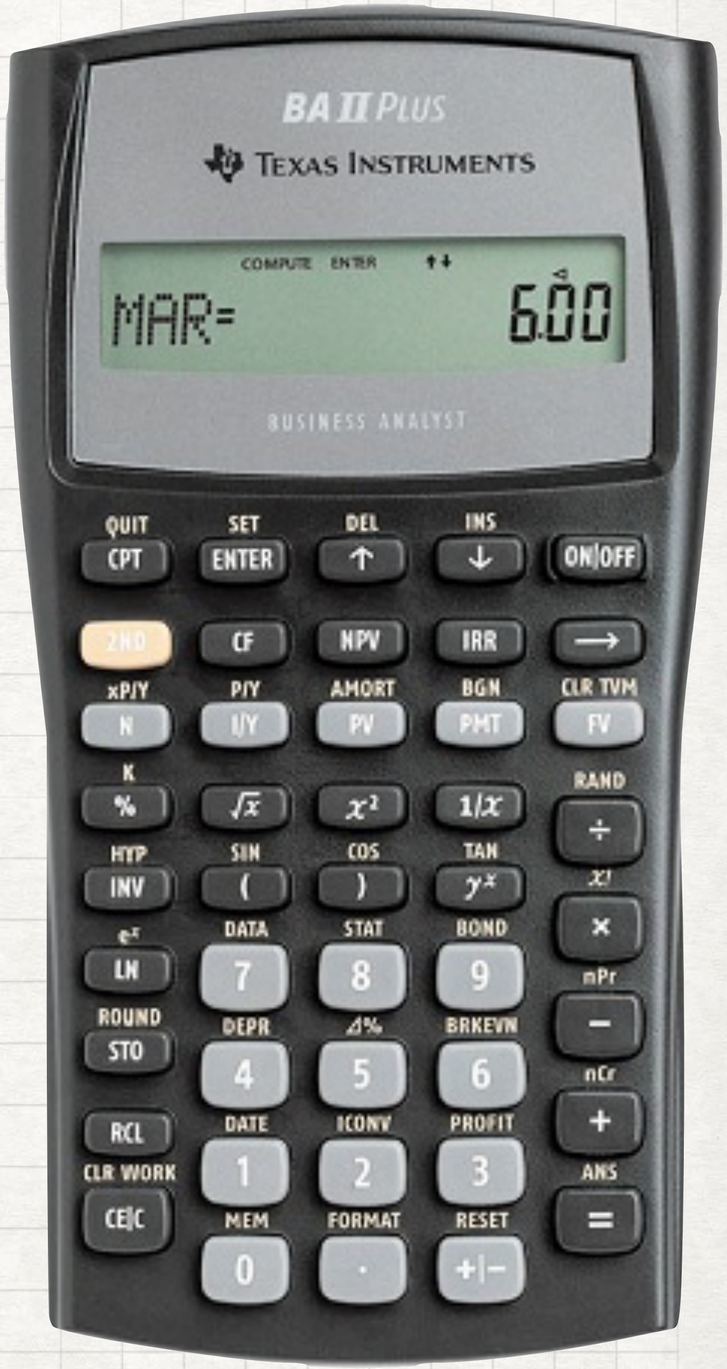
Wealth Machine

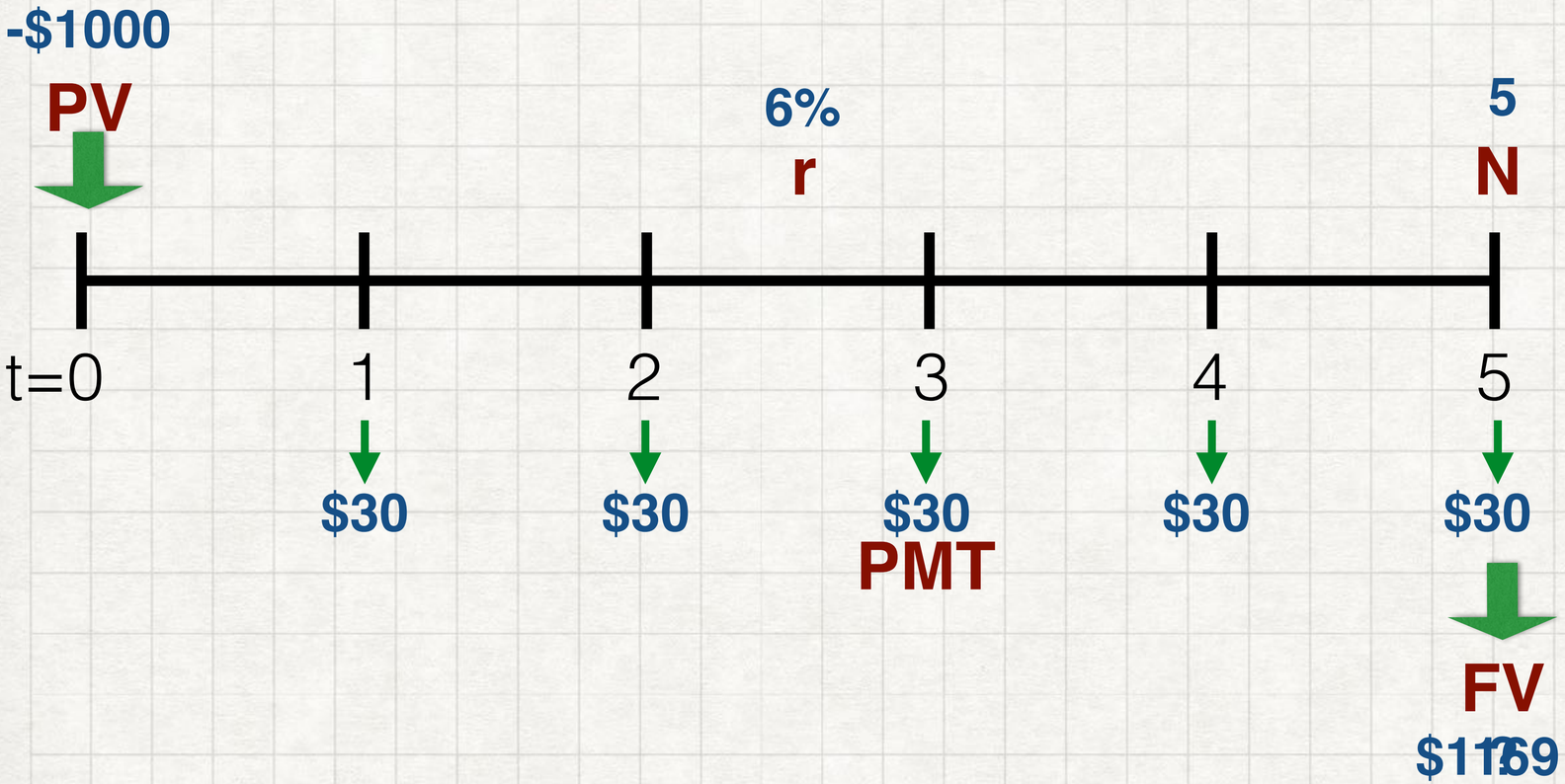
+VE

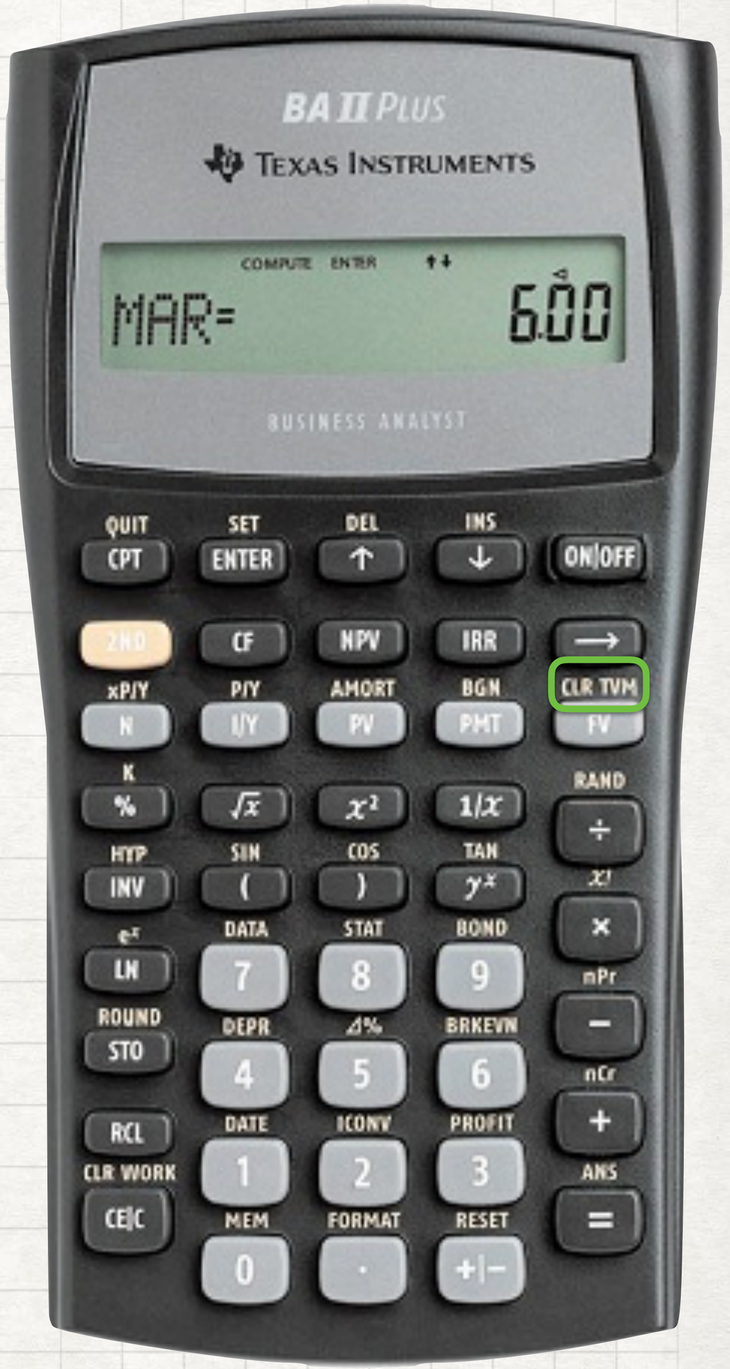


Today, an investor places $1000 in an investment account that is projected to grow at 6% per year. The account gives a guaranteed $30 dividend at the end of each year. How much is the expected amount left in the account after 5 years?





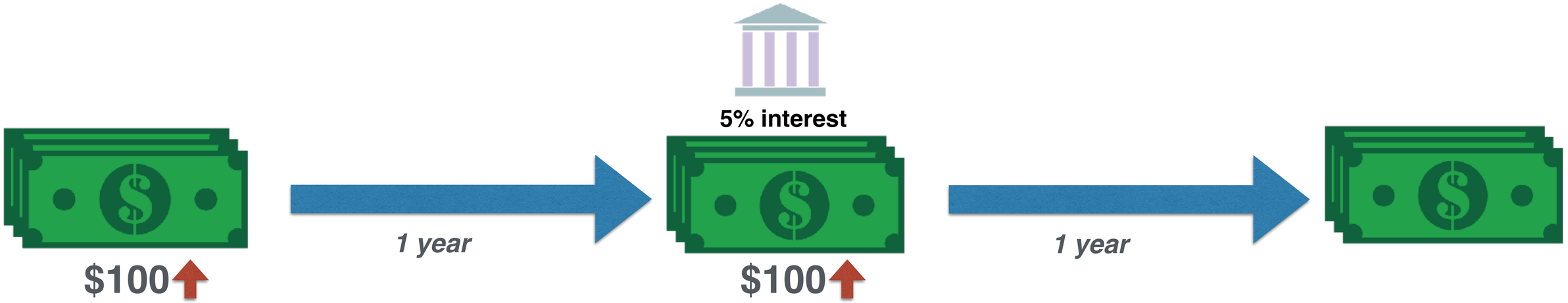




Calculate FV

2ND CLR TVM → 5 N → 6 I/Y

-1000 PV → 30 PMT → CPT FV



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$$ANS = 205 \times 1.05 = 215.25$$

METHOD 3

N = 2
I/Y = 5
PMT = -100
PV = 0

FV = 205?!!

PREP nuggets

Series of Cashflows

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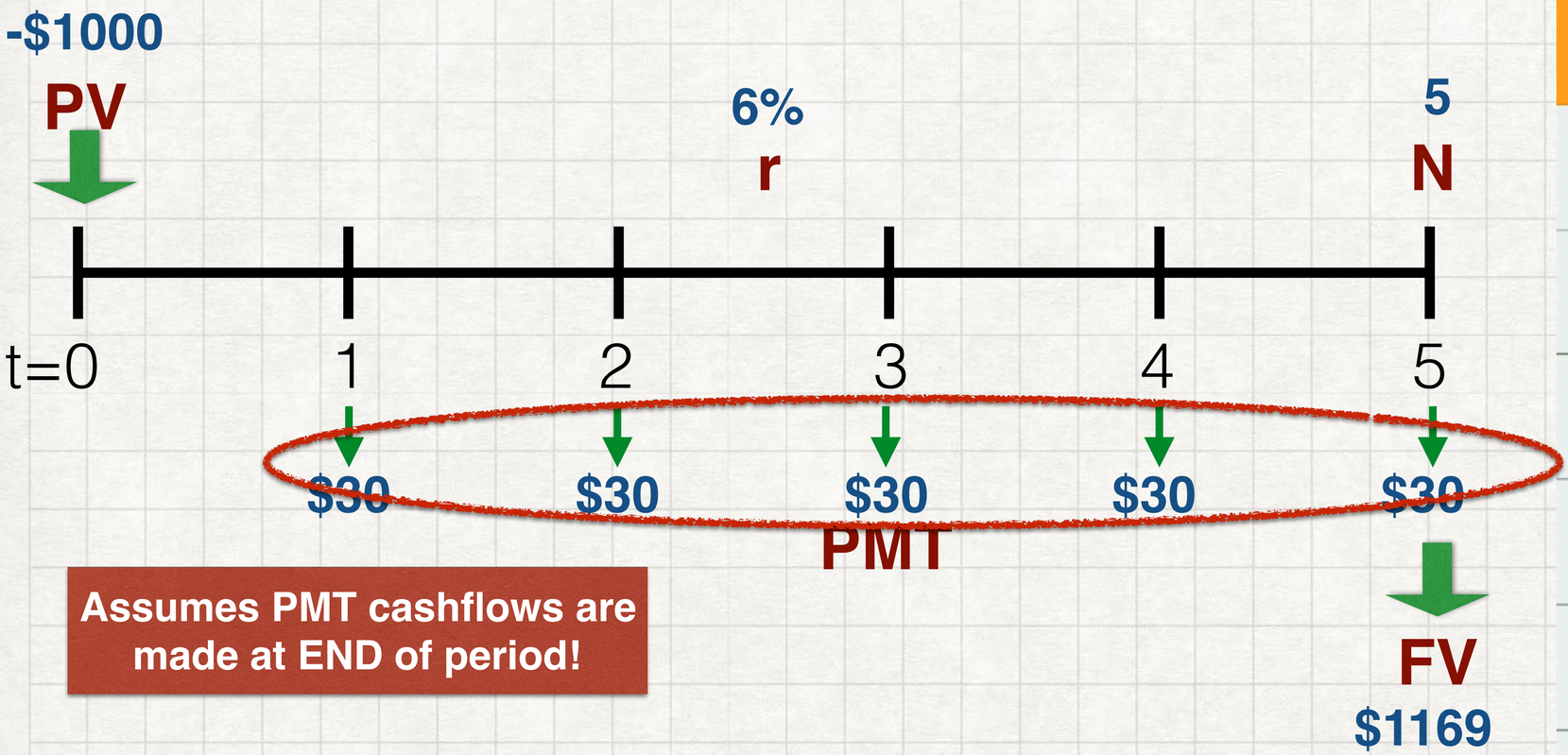
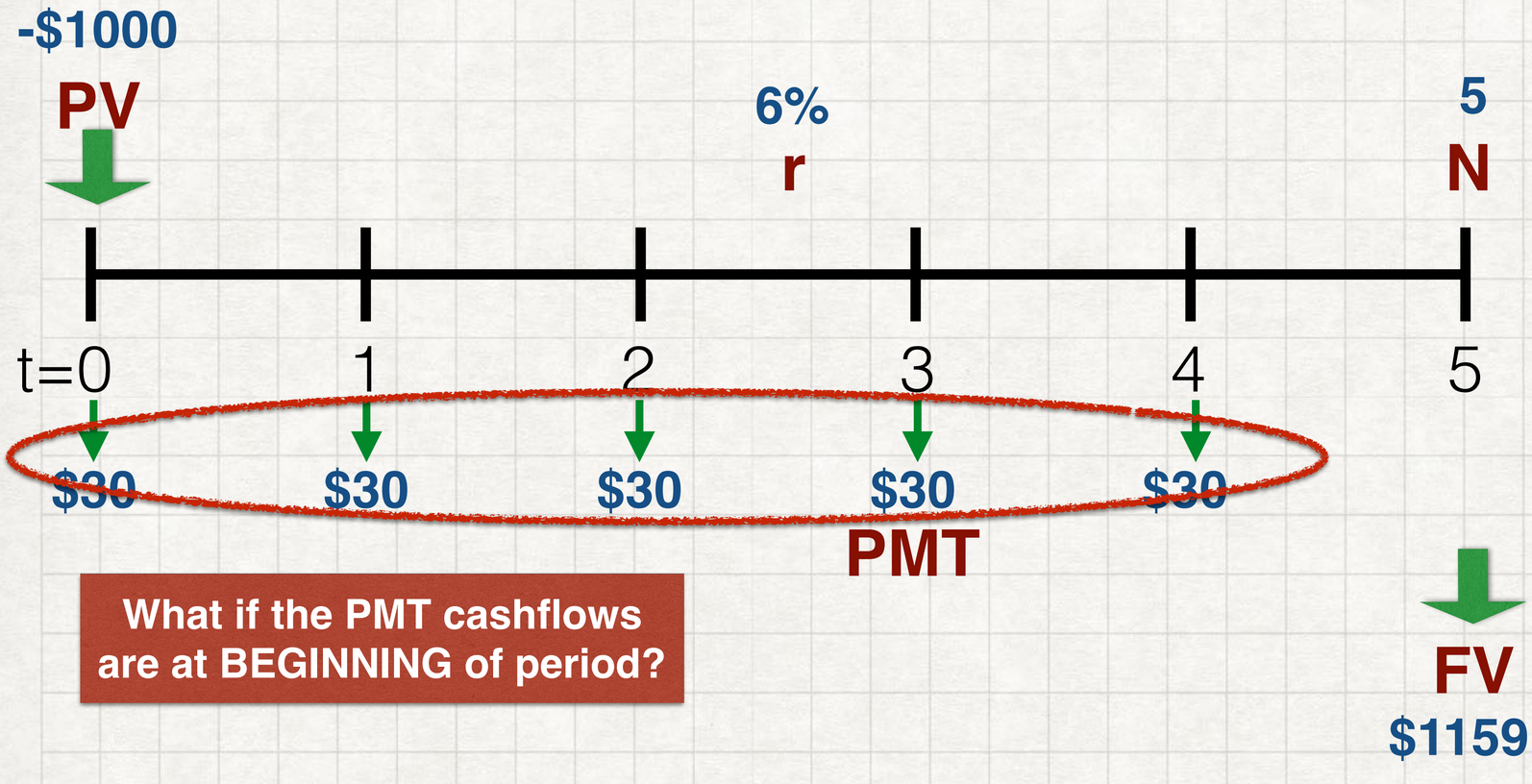


Assumes PMT cashflows are made at END of period!

Change to BGN Mode

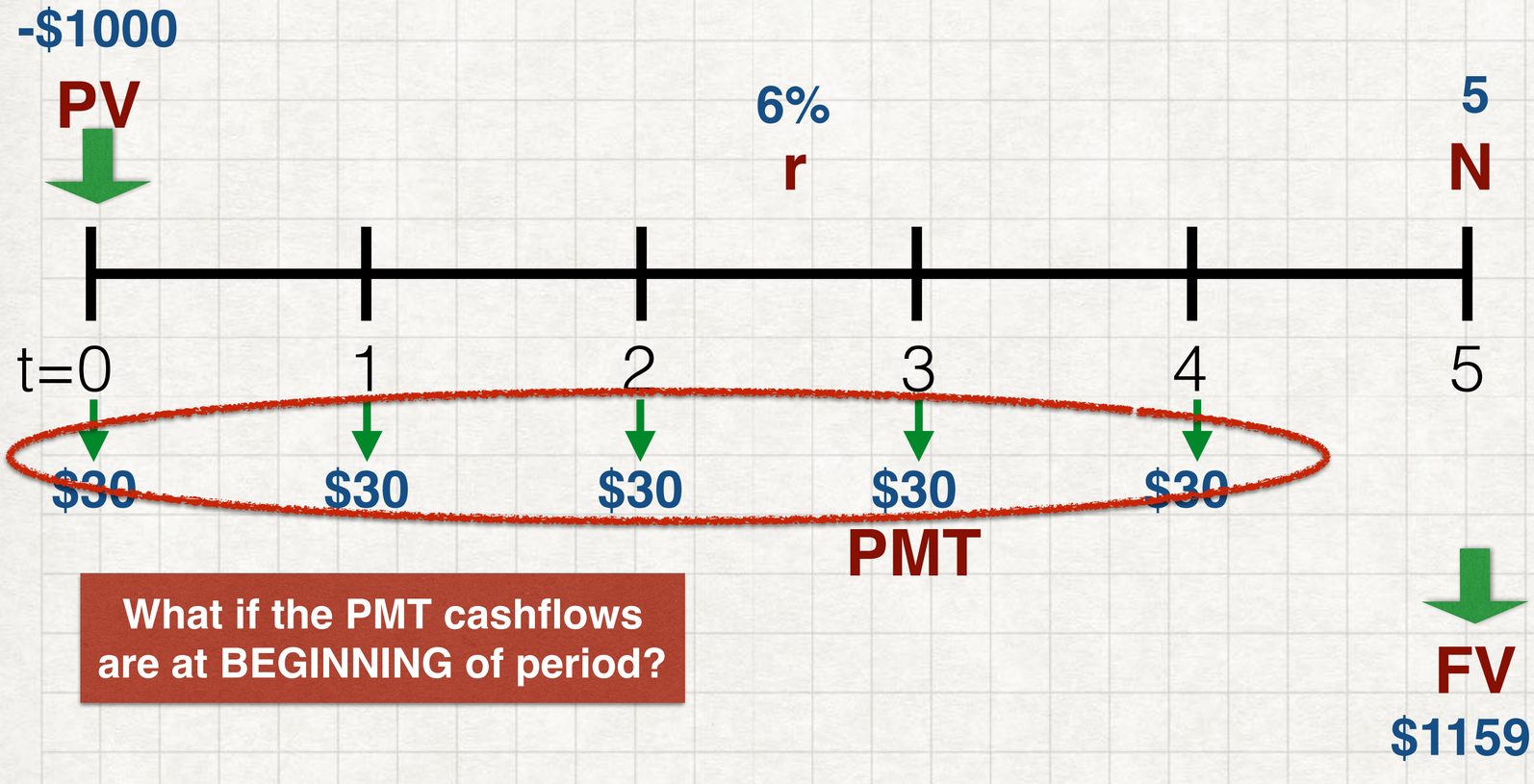
2ND BGN → 2ND SET



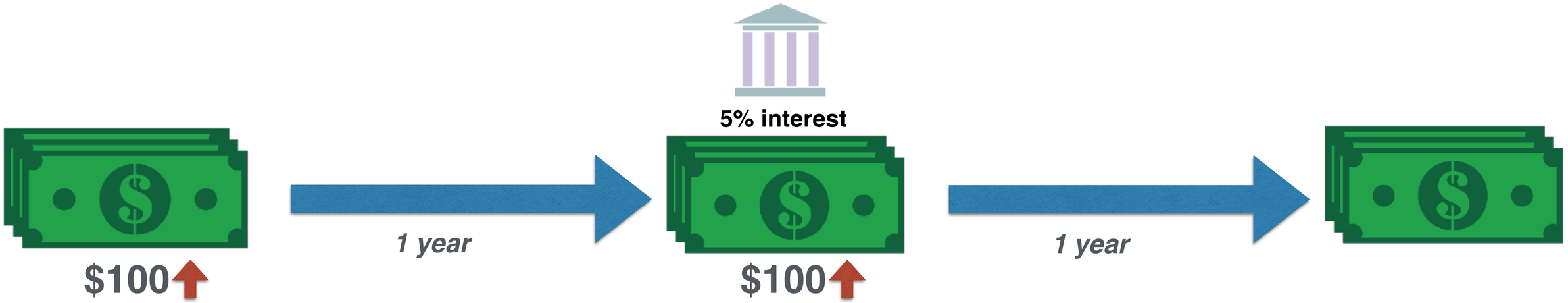
What if the PMT cashflows are at BEGINNING of period?

Change back to END Mode

2ND BGN → 2ND SET



What if the PMT cashflows are at BEGINNING of period?



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$$ANS = 205 \times 1.05 = 215.25$$

METHOD 3

N = 2
I/Y = 5
PMT = -100
PV = 0

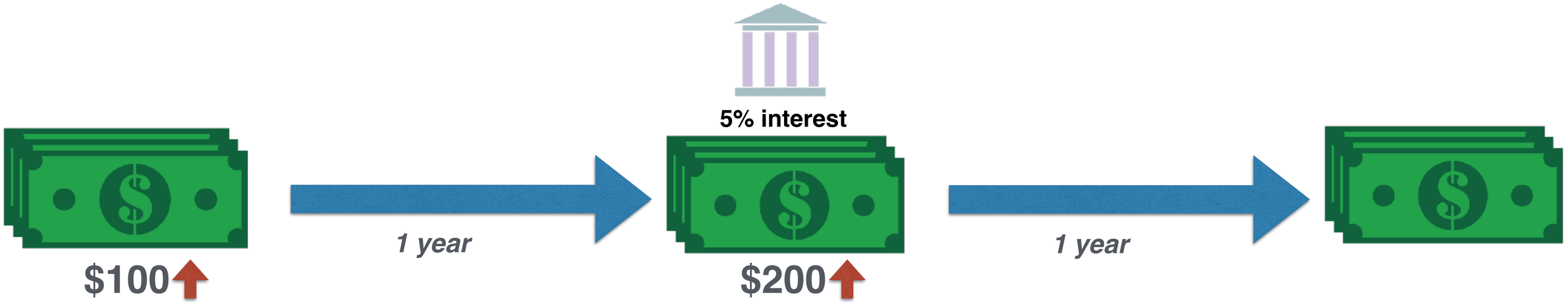
BGN Mode

FV = 215.25

PREP nuggets

Series of Cashflows

1. Regular Cashflows 2. TVM Functions 3. Uneven Cashflows



Unequal Cashflows!!

METHOD 1

$100 x (1.05)² $110.25

+

$200 x (1.05)¹ $210

$320.25

YES

METHOD 2

$$FV_N = A\left[\frac{(1+r)^N - 1}{r}\right]$$

$$FV_2 = 100\left[\frac{(1+0.05)^2 - 1}{0.05}\right] = 205$$

Al .25

NO!

METHOD 3

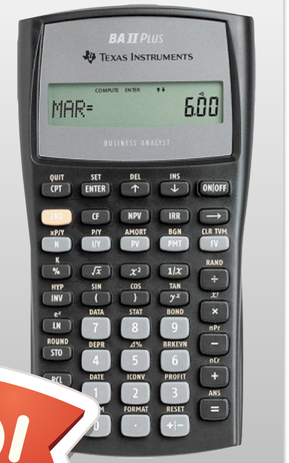
N = 2

I/Y = 5

PMT = -100

PV = 0

F



NO!

PREP nuggets

Series of Cashflows

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