## COMPOUND INTEREST

#### **REVIEW**

## Simple Interest

- Interest paid on ONLY the PRINCIPAL of an investment or loan.
- Has a LINEAR growth.

## **Compound Interest**

- Interest paid on the Principal AND it's accumulated INTEREST Calculated at regular compounding Periods and added
- the principal for the next compounding period.
- Has an EXPONENTIAL growth.

# COMPOUND INTEREST FORMULA $A = P(1+i)^n$

A = Accumulated amant (or future value)

 $P = \frac{\text{Principal}}{\text{(the initial amount)}}$ 

i = interest rate per compounding period n = number of compounding periods

### Compounding Frequency Terminology

- Annually once a year
- Semi-annually \_\_\_\_\_\_ times per year (every 6 months)
- times per year (every 3 months)
- Semi-monthly \_\_ 24\_ times per year (twice a month)
- times per year (every 2 weeks) Bi-weekly -
- times per year (but **NOT** 4 times a month) Weekly -

# Interest Rate (i)

Calculate the interest rate (i) as it would appear in the compound interest formula. (Hint: Convert to decimal and divide by the number of compounding periods)

- a) 6% semi-annually
- **b)** 5% weekly

c) 1.75% quarterly

006-2

0.05 - 52

= 0.075 ÷ 4

- 0.03

-0009615

= 0.004375

# Compounding Periods (n)

Calculate the number of compounding periods (n) as it would appear in the compound interest formula. (Hint: multiply the length of time (in years) by the # of compounding periods in the compounding frequency)

a) Compounded quarterly for 5 years

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b) Compounded semi-annually c) Compounded bi-weekly for 18 months

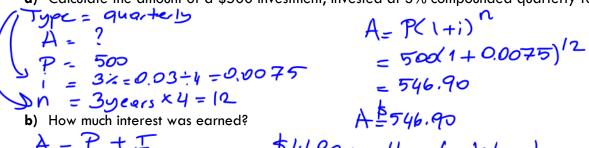
 $2 \times \frac{18}{12} = 3$ 

for 8 months

26x 6 = 13

### EXAMPLE 1

a) Calculate the amount of a \$500 investment, invested at 3% compounded quarterly for 3 years.



### **EXAMPLE 2**

Peter borrowed \$5 000 to buy a used call The interest rate on the loan was 5.45% per year, compounded monthly. He plans to repay the loan in four years.

a) How much must Peter repay?

Type= Compounded months

$$A = P(1+i)^{N}$$

$$= 5000 (1+0.004542)$$

$$= 6214.94$$

$$= 5.45\%/p \div 12 = 0.004542$$

$$= 6214.94$$

$$\therefore Peter month repay$$

$$= 4900.5 \times 12 = 48$$

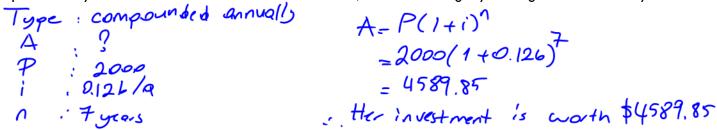
$$\Rightarrow 6214.96$$

The Peter repays the logn 6 months early how much interest will be save (not have to repay)?

b) If Peter repays the loan 6 months early, how much interest will he save (not have to repay)?

Type - C.monthly 
$$A = P(1+i)^n$$
  
 $A = ?$  = 5000(1 + 0,004542) 42  
 $P = 5000$  = 6048.2b = 165.7  $\neq$  166.7  
EXAMPLE 3 Regular

Jennifer's investment has grown by an average of 12.6% per year, compounded annually, over the past seven years. How much would her investment of \$2000 made eight years ago be worth today?



#### 3 RULES OF THUMB FOR CALCULATING COMPOUND INTEREST

- Always identify the value of each variable first.
- Remember to use BEDMAS
- Keep all decimal places in your calculator and round to 2 decimal places at the end.