Name:

Date: _____

compound interest is the addition of interest to the principle amount of the loan or deposit during a given time frame

- calculate, and add simple interest to your principle many times over your term.
- interest is made on previously accrued interest

Lengths of Time/Compounding Periods

- compounding interest once a year.
- compounding interest twice a year (every 6 months) Semi-Annually
- compounding Interest 4 times a year (every 3 months) Quarterly
- compounding inferest 12 times ayear (once a month)
- Bi-Monthly compounding interest 24 times a year (twice a month)
- compounding interest 26 times a year levery other week)
 - compounding interest 52 times a year levery week) Weekly
 - compounding interest 365 times a year (every day)

- Can be calculated using the simple interest formula in a chart to show the value of the investment after each compounding period.

Example Calculate the value of an investment of \$5000 that earns 2.35% per year, compounded **semi-annually**, for 4 years. Use a table to show the value of the investment at the end of each compounding period.

$$P = 5000$$

$$r = 2.35\% = 0.0235$$

$$t = 4 = 8$$

$$0.5$$

$$108$$

$$T = Prt$$

$$A = P + T$$

INTEREST TABLE				
Interest period	Investment value at the beginning of the period	Interest earned (\$) $I = Prt$	Investment value at the end of the period $A = P + T$	
1	5000	I=(5000)(0.0235)(0.5) = 58.75	5000 + 58.75 = 5058.75	
2	5058.75	= (505&75)(0.0235)(0.5) = 59.44	5058.75 + 59.44 =	
3	5118-19	= (5118.19)(0.0235)(0.5) = 60.14	5118.19 + 60.14	
4	5178.33	= (5178.33)(0.0235)(0.5) = 60.85	5178.33+60.85	
5	5239.18	= (5259.18)(0.0235)(0.6) = 61.66	5239.18+61.56	
b	5300.74	= (5300.74)(0.0235)(0.5) = 62.28	6300.74 + 62.28	
٦	5363.02	= (5363.02)(0.0235)(0.5) = 63.02	5363.02 + 63.02	
8	5426.04	= (5426.04)(0.0235)(0.5) = 63.76	5426.04+63.76	

The value of the investment after 4 years is: \$5480.80

only simple interest
$$I = (5000)(0.0235)(4)$$
 $A = 5000 + 470$
= 470 = 45470

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

A	full amount of loan or investment after the term is up		
P	principle or initial amount		
r	interest rate as a decimal		
t	term, in years		
	compounding period		
	Annually	1	
	Semi-Annually	2	
	Quarterly	4	
n	Monthly	12	
	Bi-Monthly	24	
	Bi-Weekly	ما 2	
	Weekly	52	
	Daily	365	

Example What is the compounded amount if \$5000 is deposited in an account for 2 years that pays 4.5% interest annually?

$$A = P(1 + \frac{r}{n})^{mt}$$

$$= 5000 (1 + \frac{0.045}{12})^{1/2})(2) \leftarrow \text{one mork}$$

$$= 5000 (1 + 0.00375)^{24}$$

$$= 5000 (1.00375)^{24}$$

$$= 5000 (1.09399)$$

$$= $5469.95$$

Example Find the compounded amount if you were to put \$400 in a bank account if the interest rate is 4.75% for 5 years and the interest is compounded weekly.

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$= 400 \left(1 + \frac{0.0475}{52} \right)^{(52)(5)}$$

$$= 400 \left(1 + 0.000913 \right)^{260}$$

$$= 400 \left(1.000913 \right)^{260}$$

$$= 400 \left(1.2679 \right)$$

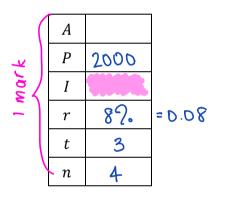
$$= $507.18$$

Because the compounded amount, A, is made up of the principal and the interest earned,

$$A = P + I$$

the amount of interest earned can be calculated by first calculating A, and then subtracting the original principal from that amount.

Example Margaret invested \$2000 in an account with an interest rate of 8% for 3 years, compounded quarterly. How much interest does she earn?



I mark
$$\rightarrow = 2000 \left(1 + \frac{0.08}{4} \right)^{(4)(3)}$$

$$= 2000 \left(1 + 0.02 \right)^{12}$$
I mark $= 2000 \left(1.02 \right)^{12}$

$$= 2000 \left(1.2682 \right)$$
I mark $\rightarrow = 42536.48$

$$\begin{array}{c}
\text{I mark} \\
\text{I mark}
\end{array}$$
= 2536.48 - 2000
$$= $536.48$$