

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

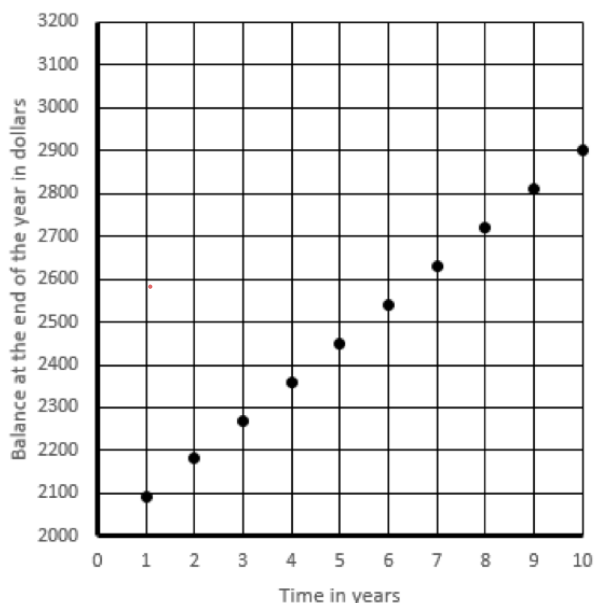
1. Complete the table below showing the banking amounts for a \$2000 investment that earns 4.5% interest each year with simple and compound interest.

Simple Interest			
Time (years)	Principal	Annual Interest	Balance at the end of the year
1	2000.00	90.00	2090.00
2	2000.00	90.00	2180.00
3	2000.00	90.00	2270.00
4	2000.00	90.00	2360.00
5	2000.00	90.00	2450.00
6	2000.00	90.00	2540.00
7	2000.00	90.00	2630.00
8	2000.00	90.00	2720.00
9	2000.00	90.00	2810.00
10	2000.00	90.00	2900.00

Compound Interest			
Time (years)	Principal	Annual Interest	Balance at the end of the year
1	2000.00	90.00	2090.00
2	2090.00	94.05	2184.05
3	2184.05	98.28	2282.33
4	2282.33	102.70	2385.03
5	2385.03	107.32	2492.36
6	2492.36	112.15	2604.52
7	2604.52	117.20	2721.72
8	2721.72	122.47	2844.20
9	2844.20	127.98	2972.19
10	2972.19	133.74	3105.93

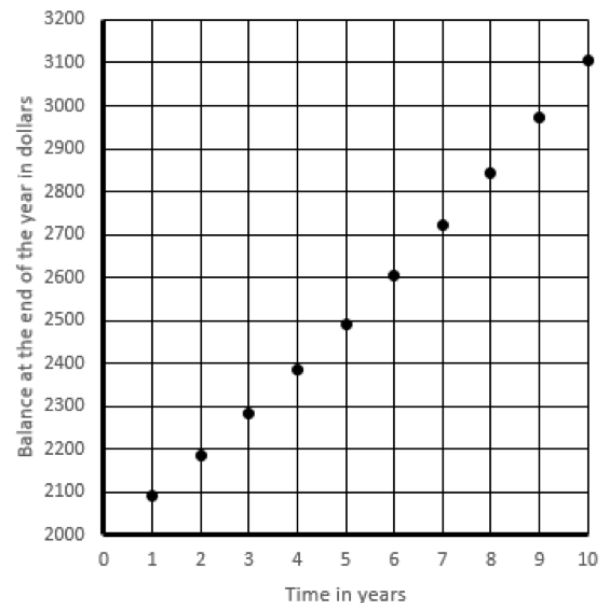
2. Graph the data from Problem 1. Then write an equation for each set of data.

Simple Interest



$$s(t) = 2000 + 90t$$

Compound Interest



$$c(t) = 2000 \cdot 1.045^t$$

3. Let's see what happens if the bank compounds the interest four times a year or quarterly. The formula $A = P\left(1 + \frac{r}{n}\right)^{nt}$, where A is the amount at the end of the number of years in your account, t is the number of years the investment has been in the bank, P is the original amount invested (principal), r is the interest rate expressed as a decimal and n is the number of times per year the amount is compounded.



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A. What does the fraction $\frac{r}{n}$ represent?

interest rate
of times interest compounds

* gives interest rate for quarter instead of whole year

B. What does the exponent nt represent?

$nt = (\# \text{ of years}) (\# \text{ of times interest compounds})$

* gives total # of quarters that \$ is in account

C. Use this formula to compute the value of \$2000 invested for 10 years with an interest rate of 4.5% with compounding four times a year. Be sure to write the equation out in the space below.

$$A = 2000 \left(1 + \frac{0.045}{4}\right)^{4 \cdot 10} = \boxed{\$ 3128.75}$$

D. Compare the amount in Part C to the simple interest and compound interest found in Problem 1 at the end of 10 years.

After 10 yrs
Simple Interest \rightarrow \$2900
Compound Interest \rightarrow \$3105.93

* you earn \$205.93 more by compounding over course of 10 years.

E. What is the value of the \$2000 if the interest is compounded daily (365 times a year)?

$$A = 2000 \left(1 + \frac{0.045}{365}\right)^{365 \cdot 10} = \boxed{\$ 3136.53}$$

F. What part of the equation do you think has the biggest impact on the amount of money in the account at the end of the time period? Explain your thinking.

Higher Interest Rate