1.2 Compound Interest

Compound Interest: the interest earned or paid on both the principal and the accumulated interest

Consider these 2 choices:

1. Ewan invests $1 000 000 in a simple interest GIC for 5 years at 3.6% annually
2. Rena invests $1 000 000 in a compound interest GIC for 5 years at 3.6% annually

Tabulate the value of each investment at the end of each of the 5 years

end of

simple	year 1	year 2	year 3	year 4	year 5
total →	1036 000	1 072 000	1 108 000	1 144 000	1 180 000

compound	year 1	year 2	year 3	year 4	year 5
interest →	36 000	37 296	×3.6% 38 638.66	40 029.65	41 470.72
total →	1036 000	1073 296	1 111 934.66	1 151 964.31	1 193 435.04

new Principal

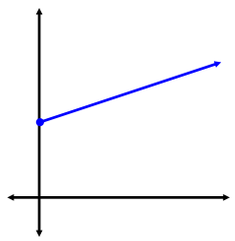
* Rena earns $13 435.04 more money with compounded interest

Simple Interest

I = Prt

Linear

Graph



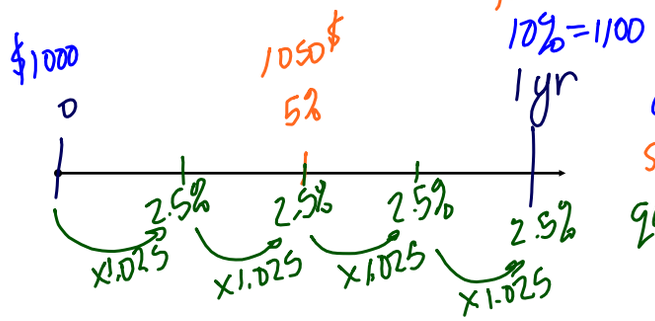
Compound Interest

$FV = P(1 + r)^t$ or n = # of compound periods

Exponential

Graph

rate for each compounding period



annually = $100

semi = 102.50

quarterly = 1000 (1.025)^4

= 103.81

Ex// Which investment will generate the largest return (increase in value) and rate of return (percentage of investment)?

1. $6000 for 4 years @ 1.2% compounded annually
2. $5000 for 5 years @ 5% compounded annually
3. $4000 for 6 years @ 6% compounded annually

1. $FV = P(1+r)^t$
$= 6000(1+0.012)^4$
$FV = 6293.23 \Rightarrow I = 293.23$ $\Rightarrow ROR = \frac{293.23}{6000}$
$= 0.04887\ldots$
$\doteq 4.89\%$

2. $FV = 5000(1+0.05)^6$
$= 6381.41 \Rightarrow I = 1381.41$ $\Rightarrow ROR = \frac{1381.41}{5000} = 27.63\%$

3. $FV = 4000(1+0.06)^6$
$= 5674.08 \Rightarrow I = 1674.08$ $\Rightarrow ROR = \frac{1674.08}{4000} = 41.852\%$

Homework: pg. 19 #1, 2 AND

1. Which generates a better rate of return?
   a) $8000 invested over 10 years @ 4.5% compounded annually
   b) $10000 invested over 8 years @ 5.5% compounded annually

2. What interest rate is needed to grow $10000 into $10506.25 over 2 years if the investment is compounded annually?

Answers
1. a) is $4423.76 with a rate of return of 55.29%, b) is $5346.87 with a rate of return of 53.47%
2. 2.5%