6.2: Geometric Sequences & Compound Interest

(I) Geometric Sequences

ex1: Find the n^{th} term

(a) 2, 6, 18, ...

(b) 4, 2, 1, ...

(c) 3, -6, 12, ...

Formula: $a_n = a_1 r^{n-1}$

ex2: Find the 10th term in the geometric sequence whose 3rd term is 12 and 7th term is 192.

Let's change gears and focus on $

(II) Simple Interest

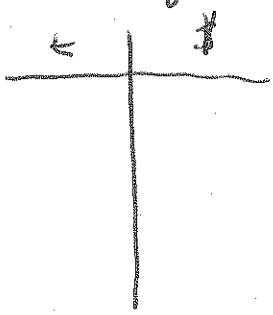
ex3: $1000 is invested @ 10% simple interest for 5 years. Find the future value.

t	$
0	1000

Formula: $S = P(1+rt)$

(III) Compound Interest

ex4: \$1000 is invested @ 10%, compounded annually for 5 years. Find the future value.



ex5: same, but semi-annual compounding.

Formula: $S = P\left(1+\frac{r}{m}\right)^{mt}$

ex6: Find the future value if \$3200 is invested for 7 yrs @ 9%.

ex7: Find out how much must be invested @ 8% to have \$17,500 for a year of uni tuition in 4 years.

ex8: Euler invests \$1 for 1 year @ 100% interest compounded N times a year.

Formula: $S = Pe^{rt}$

ex9: Find the future value if \$1000 is invested for 5 yrs @ 10% compounded continuously.

ex10: What is the doubling time for an investment that grows @ 7%, compounded cont.

ex11: Save \$1000 @ the end of each year for 5 yrs @ 10% compounded annually. What is the future value.

Five loans

$1000 \longrightarrow 1000(1.1)^4$

$1000 \longrightarrow 1000(1.1)^3$

$\vdots$

$1000 \longrightarrow 1000$

Total value: $1000 + 1000(1.1) + \ldots + 1000(1.1)^4$

This is the sum of a geometric sequence.

Formula: $S = \dfrac{a(1-r^n)}{1-r}$

ex11 cont: $S = \dfrac{1000(1-1.1^5)}{1-1.1}$

Total value is \$6105.10