Date: _____

Today's Learning Goal(s):

By the end of the class, I will be able to:

a) contrast simple and compound interest.
b) calculate simple interest.
c) calculate the "future value" of a principal with compound interest.

Last day's work: pp. 468-469 #3, 4, 7 – 10, (14 – 16)ace,
(Review) 18ace, 19b, 20, 22, 23ace
p. 470 #1 – 5, 7, 8

p.469 #196

find S_8 geo. ser. $t_1 = 42$ $t_9 = 2112$

g. ser.

$a = 42$

$r = \sqrt[8]{\frac{352}{7}}$

$n = 8$

$t_n = ar^{n-1}$

$t_1 = ar^0$

$t_1 = 42$

$\therefore a = 42$

$t_9 = ar^8$

$2112 = 42r^8$

$\frac{2112}{42} = r^8$

$\frac{352}{7} = r^8$

$r = \sqrt[8]{\frac{352}{7}}$

$\doteq 1.631$

$S_n = \frac{a(r^n - 1)}{r - 1}$

$S_8 \doteq \frac{42\left(\frac{352}{7} - 1\right)}{1.631 - 1}$

$\doteq 3276.087$

8.1 Simple Interest
8.2 Compound Interest (Future Value)

Date: June 6/17

Ex.1 Amanda invests $500 at 8% /a simple interest. per annum

a) Calculate the interest earned after 5 years.

$I = ?$
$P = 500$
$r = 0.08$
$t = 5$

$I = Prt$
$= 500(0.08)(5)$
$= \$200$

I = $200

b) Determine the total amount of her investment after 5 years.

$A = P + I$
$= 500 + 200$
$= \$700$

A = $700

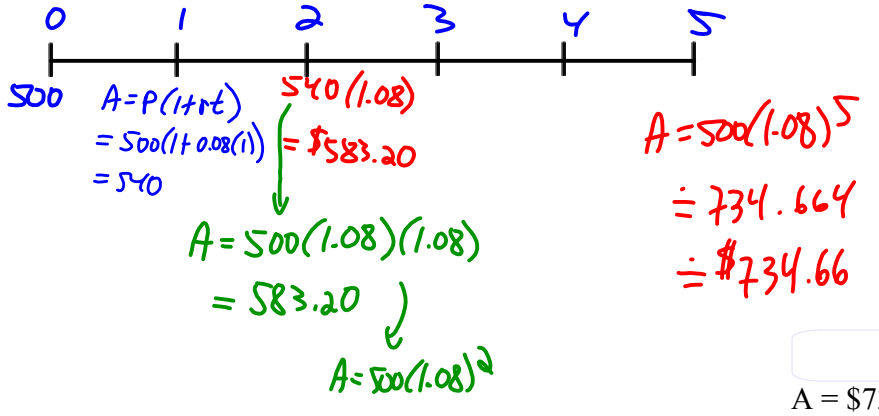
Note: Simple interest represents **linear** growth.
The function that models Amanda's investment is:

$f(x) = 40x + 500$ or in general: $f(x) = (Pr)x + P$

Simple interest is calculated only on the principal.
The total amount, *A*, and interest earned, *I*, are linear functions in terms of time, so their graphs are straight lines (see graph below). The values of *A* and *I* at the end of each interest period form the terms of two arithmetic sequences.

Ex.2 Amy invests $500 at 8% /a compounded annually.

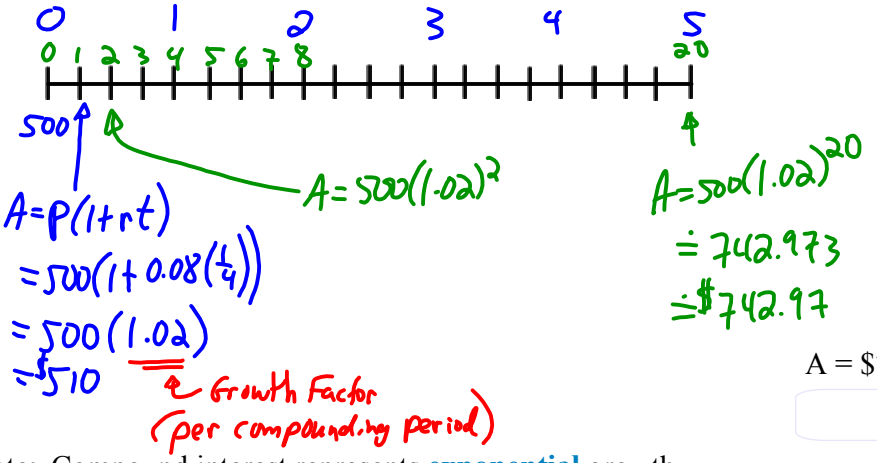
a) Determine the total amount of her investment after 5 years.



A = $734.66

Ex.3 Ariel invests $500 at 8% /a compounded quarterly.

a) Determine the total amount of her investment after 5 years.



A = $742.97

Note: Compound interest represents **exponential** growth.

The function that models Amy's investment is:

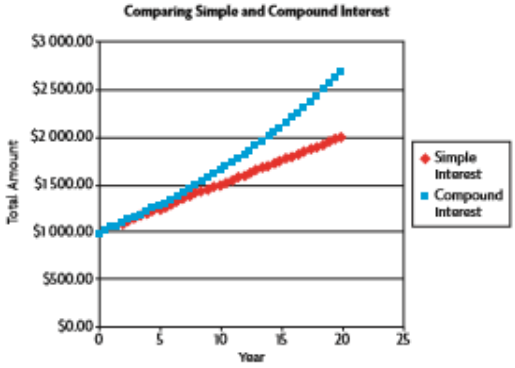
$f(x) = 500(1.08)^x$ or in general: $f(x) = ab^x$

For Ariel: $f(x) = 500(1.02)^{4x}$

Compound interest is calculated by applying the interest rate to the principal and any interest already earned.

The total amounts at the end of each interest period form a geometric sequence. So compound interest results in exponential growth.

The total amount, *A*, of an investment after a certain period is called the future value of the investment.



Simple and Compound Interest Formulae

- Simple Interest
  $I = Prt$ $A = P + I$
  $A = P(1 + rt)$
- Compound Interest
  $A = P(1 + i)^n$
  i = interest rate per compounding period
  n = number of compounding periods

P= Principal (at the start)
A= Amount (at the end)

Ex.4

a) Determine the future value of $1800 invested at 6% /*a* compounded semi-annually for 20 years.

$A = ?$, $P = 1800$, $i = \frac{0.06}{2}$, $n = 20 \times 2 = 40$

$A = P(1+i)^n$
$= 1800\left(1 + \frac{0.06}{2}\right)^{40}$
$\doteq 5871.668$
$\doteq \$5871.67$

A = $5871.67

b) How long will it take for this investment to at least double?

$A = 3600$, $P = 1800$, $i = \frac{0.06}{2} = 0.03$, $n = 2n$

$A = P(1+i)^n$
$3600 = 1800(1.03)^{2n}$
$\frac{3600}{1800} = 1.03^{2n}$
$2 = 1.03^{2n}$
$\log 2 = \log 1.03^{2n}$
$\log 2 = 2n \log 1.03$
$\frac{\log 2}{\log 1.03} = 2n$
$\frac{\log 2}{2 \log 1.03} = n$
$n \doteq 11.724$

$\therefore$ it takes about 11.72 years to double.

about 11.72 years

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 468-469 #3, 4, 7 – 10, (14 – 16)ace,
18ace, 19b, 20, 22, 23ace
p. 470 #1 – 5, 7, 8

Read the Key Ideas/Need to Know
pp.480-481 and p.489

Study for the Unit 7 Summative!!
Today's Homework Practice includes:
pp. 481-482 #5 – 10
pp. 490-492 #4 – 9, 11, 14 [20]