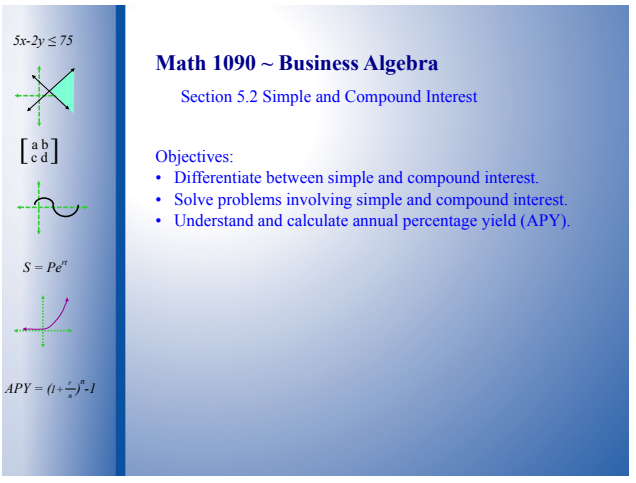

Math 1090 ~ Business Algebra

Section 5.2 Simple and Compound Interest

Objectives:
- Differentiate between simple and compound interest.
- Solve problems involving simple and compound interest.
- Understand and calculate annual percentage yield (APY).

Simple and Compound Interest

Simple Interest
- add same interest every period
- arithmetic sequence
- balance is the sum

- P = principal = start value
- Pr = principal times interest rate

$$S = P + \Pr(t)$$
$$S = P(1 + rt)$$

P = principal

r = annual interest rate

t = number of years

S = future account value

Compound Interest
- multiply by same rate every period
- geometric sequence
- balance is the sum

- P = Principal = start value
- $(1 + r)$ = factor that's multiplied by principal every year

$$S = P(1 + r)^t$$

If we compound n times per year,

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

Continuous compounding

$$S = Pe^{rt}$$

Ex 1: If $10,000 is invested for four years at an annual rate of 8%, how much will the account be worth at the end of four years?

a) simple interest b) compounded once a year

Ex 2: What is an account worth in 8 years if we started with $3000 and we got continuous compounding at a rate of 6%?

Ex 3: If $1000 is invested at 5% annual interest rate, compute these.

	balance after 5 years	how long to double investment
simple interest		
compound interest, $n = 1$		
compound interest, $n = 12$		

Ex 4: What amount must be invested now in order to have $1,000,000 for retirement in 45 years if money is compounded quarterly at 9%?

APY (Annual Percentage Yield)

Let P = $100 be invested at 8% interest compounded as given in (a) and (b). What is the account worth after one year?

a) quarterly b) monthly

$$APY = \left(1 + \frac{r}{n}\right)^n - 1$$ (periodic compounding)

$$APY = e^r - 1$$ (continuous compounding)

Ex 5: Which is a better investment deal?

a) 10% compounded annually

b) 9.8% compounded quarterly

c) 9.65% compounded continuously