Section 4.6 Compound Interest

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

n = # of compoundings per year

t = # of years

r = rate

P = present value (or principal)

A = future value

$$A = Pe^{rt}$$

continuous compounding

ex: Amount in account after 18 years if interest is 8% compounded quarterly for a $13000 investment.

annually	$n=1$
semiannually	$n=2$
quarterly	$n=4$
monthly	$n=12$
daily	$n=365$

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

$P = 13000$

$r = .08$

$t = 18$

$n = 4$

$$A = 13000\left(1 + \frac{.08}{4}\right)^{(4 \cdot 18)}$$

on calculator $13000(1+.08/4)\wedge(4*18)$ enter

$= \$54,094.82$

ex: How long will it take for a $400 investment to be worth $500 if interest is

a) compounded continuously at 6%

$A = Pe^{rt}$

$A = 500$

$P = 400$

$r = .06$

$\frac{500}{400} = \frac{400e^{.06t}}{400}$

$1.25 = e^{.06t}$

$\ln 1.25 = \ln e^{.06t}$

$\frac{\ln 1.25}{.06} = \frac{.06t}{.06}$

$t = 3.72$ yrs

b) compounded monthly at 6%

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

$500 = 400\left(\underbrace{1 + \frac{.06}{12}}_{\text{calc}}\right)^{12t}$

$1.25 = (1.005)^{12t}$

$\ln 1.25 = \ln(1.005)^{12t}$

$\frac{\ln 1.25}{(12 \ln 1.005)} = \frac{\cancel{12}t \cancel{\ln 1.005}}{\cancel{12} \cancel{\ln 1.005}}$

$3.73 \text{ yrs} = t$

p335-336
Show formula with numbers plugged in
5, 16, 29, 37