Math 21B
Kouba
Handout 1

1.) You wish for $500 in a savings account to grow to $1200 in 8 years. If interest is compounded daily, what should the annual interest rate r be ?

2.) A savings account grew from $1000 to $5200. If the annual interest rate was 3.5 % compounded yearly, how long was the money in this account ?

3.) An account with interest compounded continuously earned 5 1/2 % annual interest for 3 years. If the final amount in the account was $12,850, what was the initial amount ?

4.) An account with interest compounded continuously earned 12% annual interest. If the account grew from $2000 to $20,000, how long was the money in the account ?

5.) A child inherits $50,000, which is to be deposited in a retirement account. Account A offers an annual rate of 5 3/4% compounded continuously, and Account B offers an annual rate of 5.8% compounded once each year. Compare the amount which would be in each account after $t = 5$ years, $t = 50$ years, and $t = 75$ years.

Handout 1

1.) $A = P\left(1+\frac{r}{n}\right)^{nt} \rightarrow 1200 = 500\left(1+\frac{r}{365}\right)^{365(8)} \rightarrow$

$\frac{12}{5} = \left(1+\frac{r}{365}\right)^{2920} \rightarrow \left(\frac{12}{5}\right)^{\frac{1}{2920}} = \left(1+\frac{r}{365}\right)^{2920\cdot\frac{1}{2920}} \rightarrow$

$1+\frac{r}{365} = \left(\frac{12}{5}\right)^{\frac{1}{2920}} \rightarrow r = 365\left[\left(\frac{12}{5}\right)^{\frac{1}{2920}} - 1\right]$

$= 0.10945 = 10.945\%$

2.) $A = P\left(1+\frac{r}{n}\right)^{nt} \rightarrow 5200 = 1000\left(1+\frac{0.035}{1}\right)^{1\cdot t} \rightarrow$

$5.2 = 1.035^{t} \rightarrow \ln 5.2 = \ln 1.035^{t} \rightarrow$

$\ln 5.2 = t \ln 1.035 \rightarrow t = \frac{\ln 5.2}{\ln 1.035} \approx 47.9$ yrs.

3.) $A = Pe^{rt} \rightarrow 12{,}850 = Pe^{(0.055)(3)} \rightarrow$

$P = \frac{12{,}850}{e^{0.165}} \approx \$10{,}895.43$

4.) $A = Pe^{rt} \rightarrow 20{,}000 = 2000e^{0.12t} \rightarrow 10 = e^{0.12t} \rightarrow$

$\ln 10 = \ln e^{0.12t} \rightarrow \ln 10 = 0.12t \rightarrow t = \frac{\ln 10}{0.12} \approx 19.2$ yrs.

5.) account A: $A = Pe^{rt} = 50{,}000\,e^{0.0575t}$

account B: $A = P\left(1+\frac{r}{n}\right)^{nt} = 50{,}000\left(1+\frac{0.058}{1}\right)^{1\cdot t}$

	5 yrs.	50 yrs.	75 yrs.
account A	\$66,654.53	\$886,271.21	\$3,731,341.15
account B	\$66,282.42	\$838,018.08	\$3,430,797.50
Difference	\$372.11	\$48,253.13	\$300,543.65