13.4 notes part 2

1) Madison invests $1000 at 8.57% annual interest.

a) write a function to find the value after t years for each compounding scenario

b.) Find the effective growth rate

c.) compounded annually ($n=1$)

a) $V = 1000(1+0.0857)^t = 1000(1.0857)^t$

b) effective growth rate is $(1+0.0857)^1$ for $n=1$

$= 1.0857 - 1$

$= 0.0857$

$= 8.57\%$

cc) compounded monthly ($n=12$)

a) $V = 1000\left(1+\frac{0.0857}{12}\right)^{12t}$

b.) Effective growth rate $\left(1+\frac{0.0857}{12}\right)^{12}$

$\approx 1.0891 - 1 = 0.0891 \rightarrow 8.91\%$

ccc) Compounded weekly ($n=52$)

a) $V = 1000\left(1+\frac{0.0857}{52}\right)^{52t}$

b.) EGR $\left(1+\frac{0.0857}{52}\right)^{52} \approx 1.0894 \approx 8.94\%$

iv) compounded continuously (infinite)

a) ~~$V = 1000\left(1 + \frac{0.0857}{\infty}\right)^{\infty}$~~

$$V = Pe^{rt} = 1000\boxed{e^{0.0857}}t$$

b.) The effective growth $e^{0.0857} \approx 1.0895$

$\approx 8.95\%$

2) Stacey invests $10000 at 9.61% annual interest compounded <u>continuously</u>

$V = Pe^{rt}$

a.) Find the value in 7 years.

$V = 10000e^{(0.0961)(7)} \approx \$19,595.21$

b.) Find the effective growth rate

$e^{0.0961} \approx 1.101 \approx 10.1\%$

c.) Find the number of years for the investment to reach $40000

$V = 10000e^{0.0961t} = 40000$

$t \approx 14.4$