Section 5.6 Compound Interest – Solutions

2. $2500 = 1000(1+.055)^t \Rightarrow \ln 2.5 = \ln(1.055)^t \Rightarrow t = \frac{\ln 2.5}{\ln(1.055)} \approx$ 17.11 years. So it takes $\approx$ 17yrs, 2months for account to reach \$2500

3. $6000 = 4000(1+r)^5 \Rightarrow \frac{3}{2} = (1+r)^5 \Rightarrow r = \left(\frac{3}{2}\right)^{1/5} - 1 \approx .084471$
So interest rate is $\approx$ 8.45%

4. $10{,}000 = P(1+.07)^{10} \Rightarrow P = \frac{10{,}000}{(1.07)^{10}} \approx \$5{,}083.49$. So \$5,083.49 will grow to \$10,000 in 10 years.

6. a) $n=1$ $A = 3000(1+.06)^1 = \$3180$
b) $n=2$ $A = 3000\left(1+\frac{.06}{2}\right)^2 = \$3182.70$
c) $n=365$ $A = 3000\left(1+\frac{.06}{365}\right)^{365} = \$3185.49$

8. $A_{FRIEND} = 2000\left(1+\frac{.0525}{2}\right)^{2\cdot 8} = \$3027.48$
$A_{ME} = 2000\left(1+\frac{.0525}{365}\right)^{365\cdot 8} = \$3043.83$
I get \$16.35 more

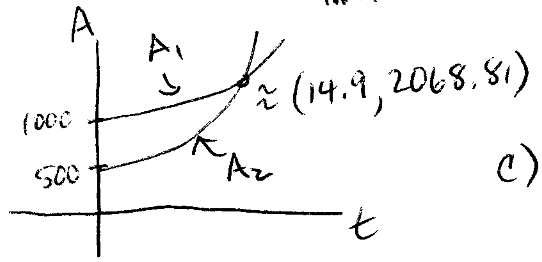
10. Effective Rate $e^{.07} - 1 = .0725$ or 7.25%

12. $A_1 = 800e^{(.06)} = \$849.47 \leftarrow$ amount in one year
A_2: $1000 = 800e^{.06t} \Rightarrow \ln\frac{1000}{800} = \ln e^{.06t} \Rightarrow t = \frac{\ln 1.25}{.06}$
≈ 3.719 years. In a little under 3yr, 9mos account grows from \$800 to \$1000

16. $A_1 = 1000e^{.08t}$ $A_2 = 1200(1+.06)^t$ – use graphing calculator to find when $A_1 = A_2$. In $\approx$ 8.4 years each account has \$1956.57 so rounding up in years (as directed) 9 years.

17. $5000 = Pe^{(.065)10} \Rightarrow P = \frac{5000}{e^{.65}} \approx \$2610.23$
so \$2610.23 will grow to \$5000 in 10 years.

28 a) $A_1 = 1000(1.05)^t$ $A_2 = 500(1.10)^t$ so A_1 doubles when
$\ln 2 = \ln 1.05^t \Rightarrow t = \frac{\ln 2}{\ln 1.05} \approx 14.21$ years A_2: $\ln 2 = \ln 1.10^t \Rightarrow t = \frac{\ln 2}{\ln 1.10} \approx 7.28$ years

b) 

In 14.9 years, both accounts have \$2068.81

c) A_1 has more money from 0 years to 14.9 years. After that A_2 has more money.