Spring '07/MAT 117/Worksheet 2 **Name:** Solution *Show all your work.*

1. (4pts) Jill deposited \$500 in an account bearing a simple annual interest rate of 5.4%. If this deposit grows to \$575, how long was it in the account?

$F = P(1+rt)$

$575 = 500(1+0.054t) \quad |\div 500$

$1.15 = 1+0.054t \quad |-1$

$0.15 = 0.054t \quad |\div 0.054$

$t = \frac{0.15}{0.054} \approx 2.78 \text{ yrs}$

2. (6pts) What is a better deal on a certificate of deposit:
a) an account earning 3.65%, compounded daily, or
b) an account earning 3.71%, compounded monthly?

a) $APY = \left(1+\frac{0.0365}{365}\right)^{1\cdot 365} - 1 = 0.0371724$ 3.71724% APY

b) $APY = \left(1+\frac{0.0371}{12}\right)^{12} - 1 = 0.0377374$ 3.77374% APY

b) is better

3. (5pts) A family that would like to buy an \$18,500 car plans to save for it over 3 years by depositing money every week into an account bearing 6%, compounded weekly. What should be the amount of the deposit?

$F = D\,\frac{\left(1+\frac{r}{n}\right)^{nt}-1}{\frac{r}{n}}$ (156 ↙ $52\cdot 3$)

$18{,}500 = D\,\frac{\left(1+\frac{0.06}{52}\right)^{52\cdot 3}-1}{\frac{0.06}{52}}$

$18{,}500 = D \cdot 170.81\ldots$

$\frac{18{,}500}{170.81\ldots} = D$

$D = \$108.30$ weekly

4. (7pts) Today, you buy the stock of Oracle corporation at \$20 per share. You hope to sell it in 3 years at \$35 per share. What annual compound interest rate would this growth correspond to?

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

$35 = 20(1+r)^3 \quad | \div 20$

$1.75 = (1+r)^3 \quad | \,\hat{}\,(\frac{1}{3})$

$1.75^{\frac{1}{3}} = 1+r \quad | -1$

$r = 1.75^{\frac{1}{3}} - 1 = 0.205071$

$r = 20.5071\,\%$

5. (8pts) Jeremy decides to set up a college fund for his newborn. If he can deposit \$200 every month into an account bearing 7.2%, compounded monthly, how long will it take until there is \$50,000 in the account?

$F = D\,\dfrac{\left(1+\frac{r}{n}\right)^{nt}-1}{\frac{r}{n}}$

$50000 = 200 \cdot \dfrac{\left(1+\frac{0.072}{12}\right)^{12t}-1}{\frac{0.072}{12}} \quad | \div 200$

$250 = \dfrac{1.006^{12t}-1}{0.006} \quad | \cdot 0.006$

$1.5 = 1.006^{12t} - 1 \quad | +1$

$2.5 = 1.006^{12t} \quad | \log$

$\log 2.5 = \log 1.006^{12t}$

$\log 2.5 = 12t \log 1.006 \quad | \div 12 \log 1.006$

$\dfrac{\log 2.5}{12 \log 1.006} = t$

$t \approx 12.76$ years