

MAC1140 SEC29 HW 10-03-2007 4.6

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Due: 10-05-2007

Full Name: Fei Hua Sec#: _____ Extra Credit Attempted? _____

1. [4.6.1bPT] If an investment pays 12% compounded monthly, how much should you deposit now to have \$350 in six years?

$$\frac{350}{(1 + \frac{0.12}{12})^{72}}$$

$$\frac{350}{(1 + \frac{0.12}{12})^6}$$

$$350(1 + \frac{0.12}{12})^{72}$$

$$350(1 + \frac{0.12}{12})^6$$

$r = 0.12$
 $n = 12$
 $P = ?$
 $A_n = 350$
 $t = 6$

$$A_n = P(1 + \frac{r}{n})^{n \cdot t} \Rightarrow 350 = P(1 + \frac{0.12}{12})^{12 \cdot 6} \Rightarrow P = \frac{350}{(1 + \frac{0.12}{12})^{72}}$$

2. [4.6.2cPT] How long will it take money to double if it is invested at 5% compounded monthly?

$$\frac{\ln 2}{\ln(1 + 0.05)}$$

$$\frac{\ln 2}{0.05}$$

$$\frac{\ln 2}{12 \ln(1 + \frac{0.05}{12})}$$

$$\frac{\ln \frac{1}{2}}{12 \ln(1 + \frac{0.05}{12})}$$

$r = 0.05$
 $n = 12$
 $P = P$
 $A_n = 2P$
 $t = ?$

Unknown in the exponent.

$$A_n = P(1 + \frac{r}{n})^{n \cdot t} \Rightarrow 2P = P(1 + \frac{0.05}{12})^{12 \cdot t}$$

$$\Rightarrow \ln 2 = \ln(1 + \frac{0.05}{12})^{12t} \Rightarrow \ln 2 = 12t \cdot \ln(1 + \frac{0.05}{12})$$

3. [4.6.2ePT] What interest rate will take an initial investment of \$20,000 to \$30,000 in 6 years with annual compounding? $\Rightarrow t = \frac{\ln \frac{3}{2}}{12 \ln(1 + \frac{0.05}{12})}$

$$(\frac{2}{3})^{\frac{1}{6}} - 1$$

$$(\frac{3}{2})^{\frac{1}{6}} - 1$$

$$(\frac{3}{2})^{\frac{1}{6}} + 1$$

$$1 - (\frac{3}{2})^{\frac{1}{6}}$$

$r = ?$
 $P = 20000$
 $A_n = 30000$
 $t = 6$
 $n = 1$

$$A_n = (1 + \frac{r}{n})^{nt} \Rightarrow 30000 = 20000(1 + \frac{r}{1})^{1 \cdot 6}$$

$$\Rightarrow \frac{3}{2} = (1 + r)^6 \Rightarrow (\frac{3}{2})^{\frac{1}{6}} = ((1 + r)^6)^{\frac{1}{6}} = 1 + r$$

$$\Rightarrow r = (\frac{3}{2})^{\frac{1}{6}} - 1$$