General Algebra II Worksheet #9 Unit 12 Selected Solutions

Solve the following problems. Show your process neatly organized. Round your answers to the nearest tenth of a year.

1. $1000 is invested in an account that pays interest at an annual rate of 6% compounded monthly. How long will it take for the value of the account to double?

$A = P(1 + \frac{R}{N})^{Nt}$ $\quad 2000 = 1000(1 + \frac{0.06}{12})^{12t}$

$A = \$2000$ $\quad 1.005^{12t} = 2$ **It will take about 5.4 years.**

$P = \$1000$

$R = 0.06$ $\quad \text{Log}(1.005^{12t}) = \text{Log } 2$

$N = 12$ $\quad 12t\,\text{Log } 1.005 = \text{Log } 2$

$t = ??$ $\quad t = \dfrac{\text{Log } 2}{12\,\text{Log } 1.005} \approx 5.4$

3. $600 is invested in an account that pays interest at an annual rate of 7% compounded continuously. How long will it take for the value of the account to double?

$A = Pe^{Rt}$ $\quad 1200 = 600e^{0.07t}$

$A = \$1200$ $\quad e^{0.07t} = 2$ **It will take about 9.9 years.**

$P = \$600$ $\quad \ln(e^{0.07t}) = \ln 2$

$R = 0.07$ $\quad 0.07t = \ln 2$

$t = ??$ $\quad t = (\ln 2) \div 0.07 \approx 9.9$

5. $600 is invested in an account that pays interest at an annual rate of 7% compounded quarterly. How long will it take for the value of the account to reach $2000?

$A = P(1 + \frac{R}{N})^{Nt}$ $\quad 2000 = 600(1 + \frac{0.07}{4})^{4t}$

$A = \$2000$ $\quad (1 + \frac{0.07}{4})^{4t} = 10/3$ **It will take about 17.3 years.**

$P = \$600$

$R = 0.07$ $\quad \text{Log}(1 + \frac{0.07}{4})^{4t} = \text{Log}(10/3)$

$N = 4$ $\quad 4t\,\text{Log}(1 + \frac{0.07}{4}) = \text{Log}(10/3)$

$t = ??$ $\quad t = \dfrac{\text{Log}(10/3)}{4\,\text{Log}(1 + \frac{0.07}{4})} \approx 17.3$

8. Money is invested in an account that pays interest at an annual rate of 4% compounded daily. How long will it take for the value of the account to double?

$A = P(1 + \frac{R}{N})^{Nt}$ $\quad 2P = P(1 + \frac{0.04}{365})^{365t}$

$A = 2P$ $\quad (1 + \frac{0.04}{365})^{365t} = 2$

$P = P$

$R = 0.04$ $\quad \text{Log}(1 + \frac{0.04}{365})^{365t} = \text{Log } 2$

$N = 365$

$t = ??$ $\quad 365t\,\text{Log}(1 + \frac{0.04}{365}) = \text{Log } 2$

$t = \dfrac{\text{Log } 2}{365\,\text{Log}(1 + \frac{0.04}{365})} \approx 17.3$

It will take about 17.3 years.