 Name: SOLUTIONS.

Some useful formulas:

$$A = P\left(1+\frac{r}{n}\right)^{nt} \qquad A = P(1+rt)$$

$$A = P\left[\frac{(1+i)^m - 1}{i}\right] \qquad V = P\left[\frac{1-(1+i)^{-m}}{i}\right]$$

(1) [5] How much should be deposited now in order to have \$100 after two years if the interest rate is 3% compounded monthly?

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

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

$$= \frac{100}{\left(1+\frac{0.03}{12}\right)^{(12)(2)}}$$

$$= \boxed{\$94.18}$$

(2) [5] What rate of interest compounded annually is required to double an investment in 3 years?

Solve:

$$\not{P}\left(1+\frac{r}{1}\right)^{(1)(3)} = 2\not{P}$$

$$(1+r)^3 = 2$$

$$1+r = 2^{\frac{1}{3}}$$

$$r = 2^{\frac{1}{3}} - 1$$

$$r \doteq 0.2599 = \boxed{25.99\%}$$

(3) [5] A person wishes to accumulate $12,000 to buy a car three years from now. Equal deposits will be made at the end of every three months into an account paying 2% compounded quarterly. How much should each deposit be in order to reach the $12,000 goal?

$$A = P\left[\frac{(1+i)^m - 1}{i}\right].$$

Here $A = 12{,}000$

$m = (3)(4) = 12.$

$i = \frac{0.02}{4} = 0.005$

$$\therefore \quad P = \frac{iA}{(1+i)^m - 1}$$

$$= \frac{(0.005)(12000)}{(1+0.005)^{12} - 1}$$

$$= \boxed{\$972.80}$$

Timeline here is: