

36000 Solutions Monthly

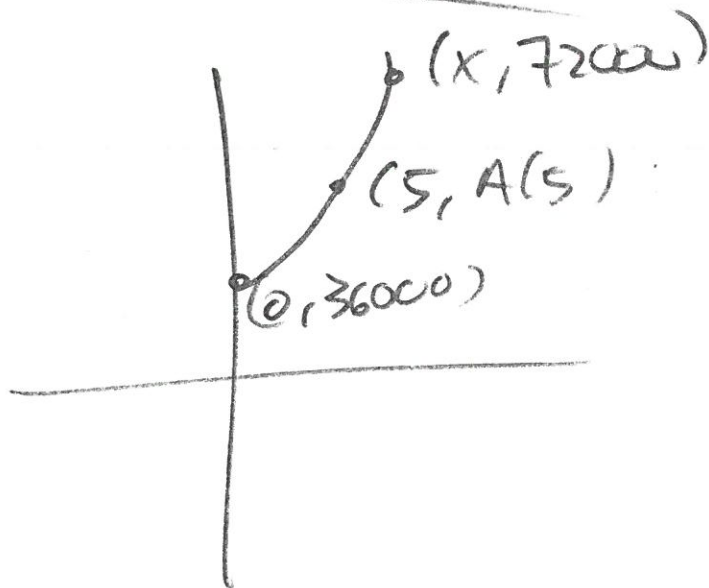
$$n = 12 \text{ (monthly)}$$

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

$$P = 36000$$

$$r\% = 4.32\%$$

$$r = 0.0432$$



$$A = 36000 \left(1 + \frac{0.0432}{12}\right)^{12t}$$

model

$$A(5) = 44662.36$$

Balance
after
5 years

$$\begin{aligned} \text{Earnings after 5 yrs} \\ 44662.36 - 36000 \\ = 8662.36 \end{aligned}$$

$$72000 = 36000 \left(1 + \frac{0.0432}{12}\right)^{12X}$$

$$\frac{72000}{36000} = \frac{36000 \left(1 + \frac{0.0432}{12}\right)^{12X}}{36000}$$

$$2 = \left(1 + \frac{0.0432}{12}\right)^{12X}$$

By Defn

$$\log \left(1 + \frac{0.0432}{12}\right) (2) = 12X$$

$$X = \frac{\log \left(1 + \frac{0.0432}{12}\right) 2}{12}$$

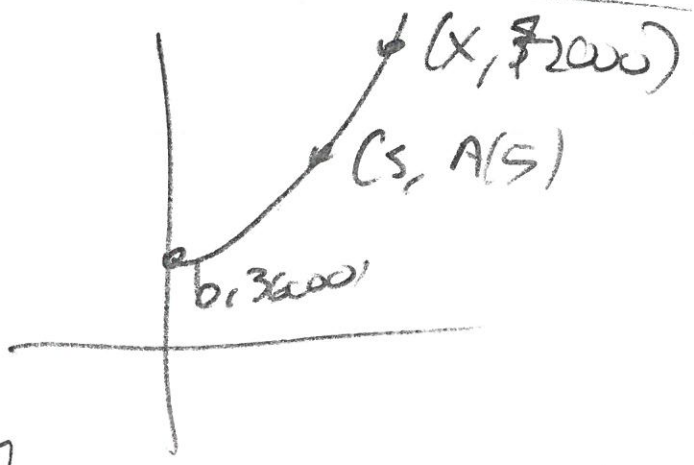
$$X \approx 16.0740$$

Doubling Time

$$\checkmark\checkmark \quad A(16.0740) \approx 72000.19$$

36000 solutions weekly Compounding

$P = 36000$
 $n = 52$ (weekly)
 $r\% = 4.32\%$
 $i = 0.0432$



$$A = 36000 \left(1 + \frac{0.0432}{52}\right)^{52X}$$

model

$$72000 = 36000 \left(1 + \frac{0.0432}{52}\right)^{52X}$$

$$\frac{72000}{36000} = \frac{36000 \left(1 + \frac{0.0432}{52}\right)^{52X}}{36000}$$

$$A(s) = 44675.68$$

Balance after s years

$$2 = \left(1 + \frac{0.0432}{52}\right)^{52X}$$

Earnings after s years

$44675.68 - 36000$
 8675.68

By Log

$$\log_{1 + \frac{0.0432}{52}} 2 = 52X$$

$$X = \frac{\log_{1 + \frac{0.0432}{52}} 2}{52}$$

$$\approx 16.0517$$

✓

$$A(16.0517) \approx 71999.88$$

Doubling Time?

36000 etc compounded

$$P = 36000$$

$$r\% = 4.32\%$$

$$r = 0.0432$$

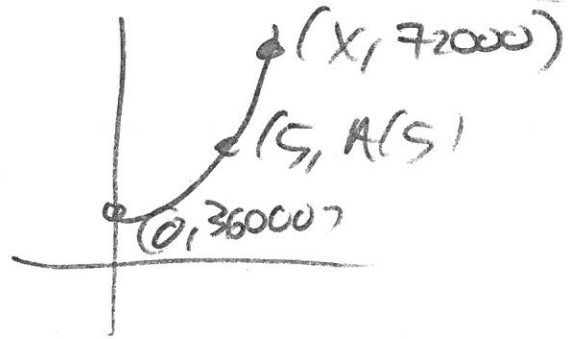
$$A(x) = 36000 e^{0.0432x}$$

model

$$A(5) = 44679.69$$

Balance after 5 years

$$\begin{aligned} \text{Earnings after} \\ \text{5 years} \\ 44679.69 - 36000 \\ = 8679.69 \end{aligned}$$



$$72000 = 36000 e^{0.0432x}$$

$$\frac{72000}{36000} = \frac{36000 e^{0.0432x}}{36000}$$

$$2 = e^{0.0432x}$$

By Defn

$$\ln 2 = 0.0432x$$

$$x = \frac{\ln 2}{0.0432}$$

$$x \approx 16.0451$$

Doubling Time

✓✓



$$A(16.0451) \approx 72000.08$$

Gover Model $A(x) = 35000 e^{0.026x}$

$P = 35000 \rightarrow$ Principal

$r = 0.026 \rightarrow$ as decimal

$r\% = 2.6\% \rightarrow$ as a percent

Cts compounded interest "e"

$$A(10) = 35000 e^{0.026(10)} \\ \approx 46689.48$$

← Balance after 10 years

$$A(x) = 5000 + 35000 = 40000 \leftarrow \begin{array}{l} \text{Balance when} \\ \text{you} \\ \text{earned} \\ \text{\$5000} \end{array}$$

Solve $40000 = 35000 e^{0.026x}$

$$\frac{40000}{35000} = \frac{35000 e^{0.026x}}{35000}$$

$$\frac{40000}{35000} = e^{0.026x}$$

By Defn

$$\ln\left(\frac{40000}{35000}\right) = 0.026x$$

$$x = \frac{\ln\left(\frac{40000}{35000}\right)}{0.026} \approx 5.1358 \text{ years}$$

Time it takes to earn \$5000

What rate do I need to invest at?

$$P = 100000$$

$$r = ?$$

$$A = 500000$$

$n =$ cts compounding "e"

$$x = 18 \text{ years}$$

$$A(x) = 500000 = 100000 e^{r(18)}$$
$$\frac{500000}{100000} = \frac{100000 e^{18r}}{100000}$$

$$5 = e^{18r}$$

By Defn $\ln 5 = 18r$

$$r = \frac{\ln 5}{18}$$

exact
rate
←

$$r \approx 0.0894$$

approx
rate
as
decimal

$$r\% \approx 8.94\%$$

$$\checkmark \checkmark A(18) = 100000 e^{0.0894(18)}$$
$$\approx 499881.06$$