Compounded Interest & Exponential functions



An infectious disease begins to spread in a small city of population 10,000. After t days, the number of persons who have succumbed to the virus is modeled by the function:



$$v(t) = \frac{10,000}{5 + 1245e^{-0.97t}}$$

How many infected people are there initially?

$$V(t) = \frac{10,000}{(5+1245e^{5.97(6)})} t = 0$$

How many people are infected after five days?

$$V(t) = \frac{10,000}{5+1245e^{-0.97}(5)}$$
678 people

Compound Interest

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



t = time in years

n = number of times it's compounded per year

Compounded: annually n = 1

quarterly n = 4 monthly n = 12 daily n = 365



\$4000 at 3% compounded monthly for 15 years
$$A = P\left(1 + \frac{\Gamma}{\Gamma}\right)$$

$$A = 4000\left(1 + \frac{03}{12}\right)$$
\$6,269.73



\$8000 at 6.5% compounded quarterly for 8 years
$$A = 8000 (1 + \frac{.565}{4})^{(4)(8)}$$

$$\frac{13,400.09}{13,400.09}$$

\$600 at 9% compounded daily for 20 years



\$300 at 6% compounded annually for 25 years



Compounded Continuously:



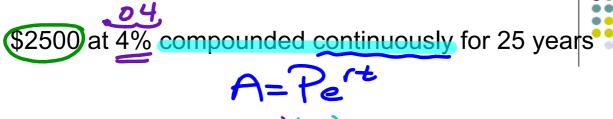
$$A(t) = Pe^{rt}$$

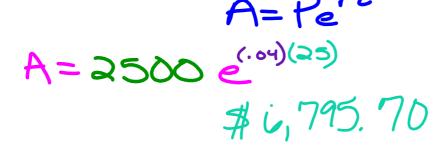
P = Principal

r = rate

t = time in years

e = 2.718281828...





Suppose your are offered a job that lasts one month, and you are to be very well paid. Which of the following methods of payment is more profitable for you? How much will you make?



- One million dollars at the end of the month.
- Two cents on the first day of the month,
- 4 cents on the second day, 8 cents on the third day, and so on.
- Write an exponential equation to represent how many pennies you will have on any given day.