Compound interest. One thousand dollars is invested at 5% compounded continuously

a) Give the formula for $A(t)$, the compound amount after t years

b) How much $ will be in the account after 6 years

c) After 6 years, at what rate will $A(t)$ be growing? ($A(t)$: Amount)

d) What is the time required to the initial investment to death?

Ans: a) $A = P\left(1+\frac{r}{n}\right)^{nt}$ | $e = \lim_{n\to\infty}\left(1+\frac{1}{n}\right)^{n} = e$

$A = Pe^{rt}$ (P = principal amount, r = rate of interest, t = number of years.)

$P = \$1000$, $r = 5\%$, $\boxed{A = 1000e^{0.05t}}$

b) After 6 years, $A(6) = 1000e^{0.05\times 6} = 1000e^{0.3} \approx \$1349.86$

c) Rate of growth $= A'(t) = 1000 \times 0.05 \cdot e^{0.05t} = 50e^{0.05t}$

$A'(6) = 50e^{(6.05)6} = 6^{0.3} \approx \$67.49.$

d) $2000 = 1000e^{0.05t} \Rightarrow e^{0.05t} \times 2 \Rightarrow t \cdot 0.05 = \ln 2 \Rightarrow t = \frac{\ln 2}{0.05} \approx 13.86$ years

Check online for practice question.
Some have solutions.
Some not