

SOEN 6481 – Software Requirement Specification

Problem 1 – Natural Logarithm of 2

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Natural Logarithm:

The natural log gives you the time needed to reach a certain level of growth. The natural log is the inverse of e, the Latin name is logarithmus naturali, giving the abbreviation ln.

$\ln(1) = 0$; which means that there is no time growth from 1 to 1.

$\ln(0.5)$ = undefined; because we can not have a negative time progress.

$\ln(\text{negative number})$ = undefined; Undefined just means “there is no amount of time you can wait” to get a negative amount.

The natural log can be used with any interest rate or time as long as their product is the same.

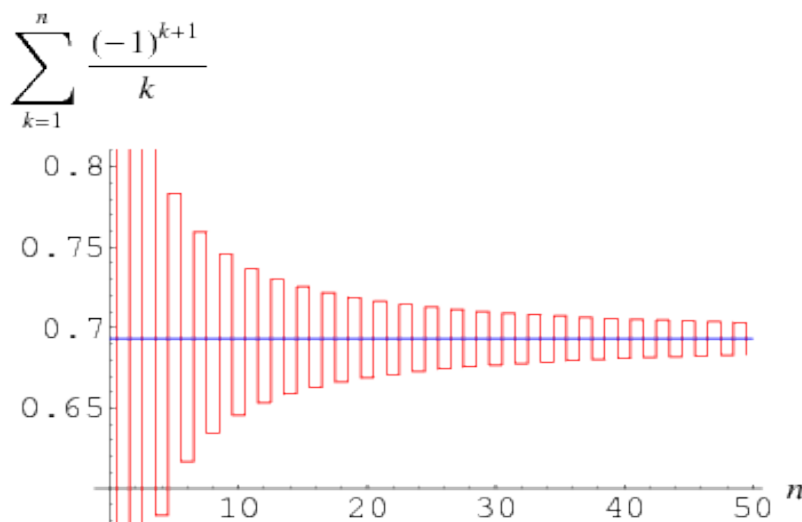
Algebraic Number: To be algebraic, a number must be a root of a non-zero polynomial equation with rational coefficients.

Transcendental Number: A Transcendental Number is any number that is not an Algebraic Number.

The natural logarithm of 2 is a transcendental quantity.

$\ln(2) = 0.6931472..$

It is not known if $\ln 2$ is normal (Bailey and Crandall 2002).



The plot above shows the result of truncating the series for $\ln 2$ after n terms.

Question: How long to double the money at 100% interest?

Answer: $\ln(2) = .693$. It takes .693 units of time to double your money with continuous compounding with a rate of 100%.