

Applications of Exponential Functions

Situations involving **exponential growth** and **exponential decay** can be modelled using exponential functions.

Examples of exponential growth:

Examples of exponential decay:

Exponential Growth Formula

$y = A(1+r)^x$, where A is the initial amount
 x is the number of growth periods
 r is the growth rate, as a decimal

Exponential Decay Formula

$y = A(1-r)^x$, where A is the initial amount
 x is the number of decay periods
 r is the decay rate, as a decimal

Example 1: Lena has inherited \$1000. She decides to invest it into an account that pays 7.5% per year, compounded annually.

a) Find the amount of the investment after 5 years.

b) How long will it take her to double her money in this investment?

Example 3: The population of a bacteria colony, p , is doubling every 3 days. If the initial bacteria count is 30, what is the count after 24 days?

Example 4: A radio-active substance has a mass of 200g. Every 18 hours, the mass of the original sample decays to one-half of the original amount. (Note: this means the substance has a half-life of 18 hours)

a) Find the mass of the substance after i) 72 hours and ii) 5 days

b) How long will it take for the substance to decay to 50 g?

