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

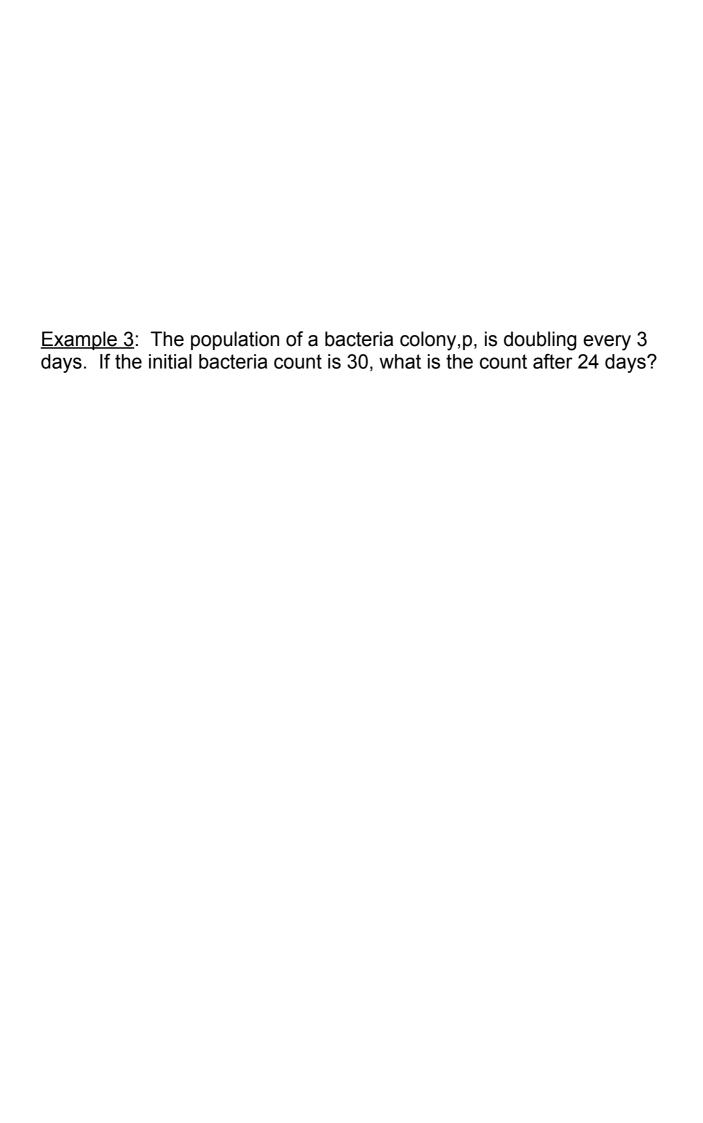
<u>Example 1</u>: Lena has inherited \$1000. She decides to invest it into an account that pays 7.5% per year, compounded annually.

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

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

its re	mple 2: A ball is dropped and bounces several times, losing some of ebound height after each bounce. The height reached, h, in metres, r n bounces is given by the equation h=1.5(0.75) ⁿ .
a)	From what height was the hall initially dropped?

- a) From what height was the ball initially dropped?
- b) What is the height of the ball after 4 bounces?
- c) Determine how many bounces it will take before the ball's rebound height is less than 1% of its initial drop height.



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)	ıl
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?	