chapter 7

Algebra 3

Section 7.8 Exponential functions

have shape: $f(x) = Aa^x$

Example 1

A bacterial colony doubles every hour. If 10 bacteria cells were present at the start of an experiment, (i) complete the following table (ii) draw a graph of the number of bacteria present up to 5 hours.

	Time in hours	0	1	2	3	4	5	6
y	Number of bacteria	10	20	40	80	160	320	640

t=0 n=1 t=1 n=2

(iii) By how many would the population increase in the 6th hour?

(iv) What percentage increase in the population occurred in the 6th hour by comparison to the first hour?

(v) Write an expression for the size of the population (N) after t hours.

320 , 10

$\frac{320}{10} \times 100 = 3200\%$

$f(0) = 10$

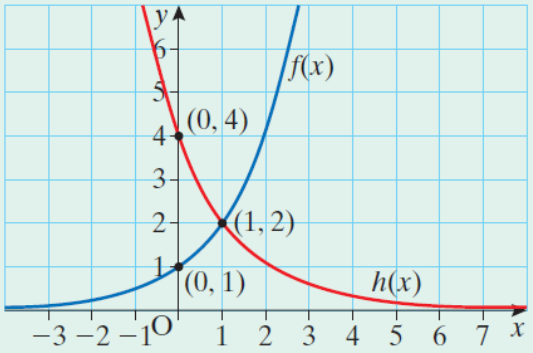
$f(1) = 20 = 10(2)$

$f(2) = 40 = 10(2^2)$

$\Rightarrow f(t) = 10(2^t)$

Example 2

The graphs of two exponential functions $y = Aa^x$ are given in this diagram. Find the values of A and a for each graph.



Red curve

$(0,4) \Rightarrow 4 = Aa^0 =$

$\Rightarrow 4 = A$

$(1,2) \Rightarrow 2 = Aa^1$

$2 = (4)a$

$\Rightarrow a = \frac{2}{4} = \frac{1}{2}$

Blue curve: $(0,1) \Rightarrow 1 = Aa^0 \Rightarrow A = 1$

$(1,2) \Rightarrow 2 = Aa^1 \Rightarrow 2 = (1)a \Rightarrow 2 = a$