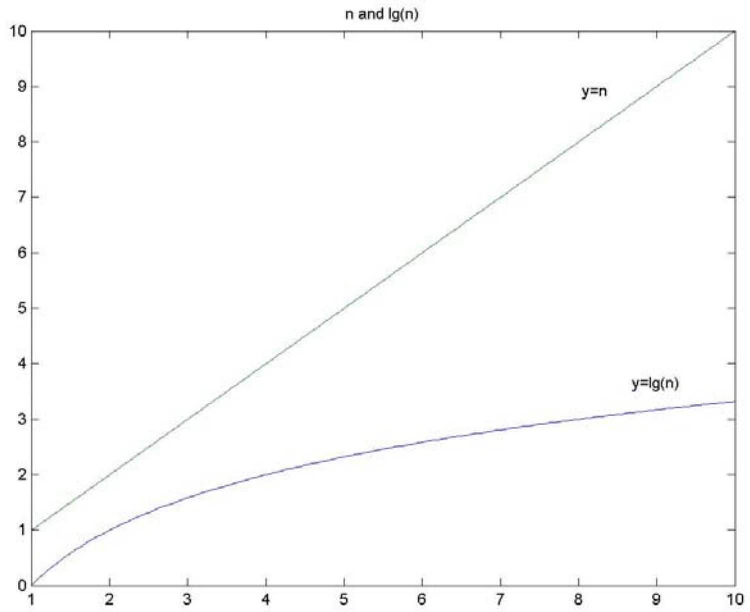
Introductory Logarithm Notes

In this exercise we will only deal with logarithms with a base of 2. We could use any base, but it is common in computer science to use the base 2, since it occurs so often.

If $x = 2^y$ then we say $\log_2 x = \lg x = y$. That is to say, if *y* is the power we must raise *x* to in order to achieve a value of *y*, then lg(*x*)=*y*. The table below illustrates this. Copy and complete the table.

$2^6 = 64$	$\lg(64) = 6$
$2^5 = 32$	$\lg(32) = 5$
$2^4 = 16$	$\lg(16) =$
$2^3 = 8$	$\lg(8) =$
$2^2 = 4$	$\lg(4) =$
$2^1 = 2$	$\lg(2) =$
$2^0 = 1$	$\lg(1) =$
$2^{-1} = 0.5$	$\lg(0.5) =$
$2^{-2} = 0.25$	$\lg(0.25) =$
$2^{-3} = 0.125$	$\lg(0.125) =$
$2^k = n$	$\lg(n) =$
$2^j = m$	$\lg(m) =$

It is worth noting that as *n* increases towards infinity, lg(*n*) also increases towards infinity, but incredibly slowly. The graph below compares lg(*n*) to *n*.



By using your calculator to raise 2 to the powers in the top row, find the logs of the numbers in the bottom row. Join the dots, connecting a logarithm with its *x* value.

$\log(x)=4.087$	$\log(x)=2.807$	$\log(x)=1.585$	$\log(x)=3.170$	$\log(x)=3.459$
•	•	•	•	•
•	•	•	•	•
$x=3$	$x=9$	$x=17$	$x=11$	$x=7$

Use your calculator to estimate lg(10) to 2 decimal places. (Estimate the log, say *a* and check by finding 2^a. If it is too large, make your estimate smaller and if it is too small, then make your estimate larger.)

a	2^a	Too small	Too large
3	8	X	
4	16		X
3.3	9.849	X	

Now carry on and find the log correct to 2 decimal places!