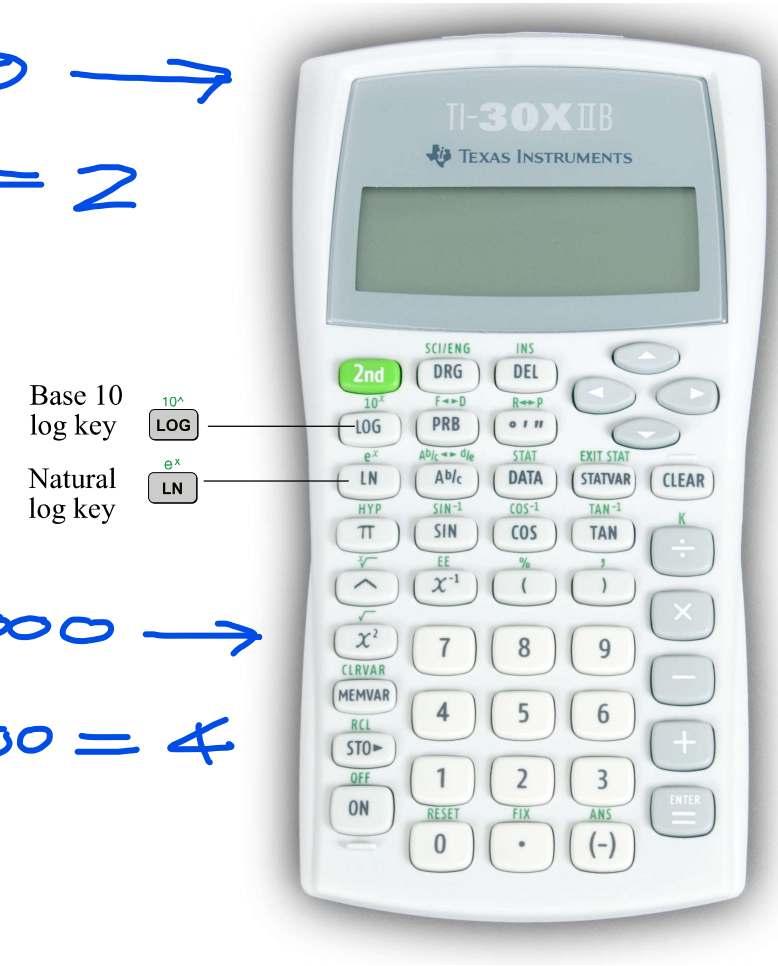
13. Exponential and logarithmic functions

There are two log keys on your calculator, with their associated exponential keys. The latter are accessed by first using the shift key:



The 'log' key uses base 10 and the 'ln' key uses base e (natural logarithm).

Example 1

Solve equation $2^a = 20$

Taking logs of both sides;

$$\log 2^a = \log 20$$
$$\Rightarrow a \log 2 = \log 20$$
$$\Rightarrow a = \frac{\log 20}{\log 2}$$

To find the value of a, the keystrokes are:

LOG 2 0) ÷ LOG 2 ENTER

The display should read 4.3219281.

So, $2^{4.32} \approx 20$. Confirm this by using the [^] key.

Example 2

Given $\log y = 1.584$, find the value of y

$\log y = 1.584$

$\Rightarrow y = 10^{1.584}$

The 10^x key is above the log key. Hence the keystrokes are:

[2nd] [LOG] [1] [•] [5] [8] [4] [ENTER]

The display should read 38.370725

Example 3 (harder)

Given $\log_x 6 = 1.5$, find the value of x

$\log_x 6 = 1.5$

$\Rightarrow \dfrac{\log 6}{\log x} = 1.5$

$\Rightarrow \dfrac{\log 6}{1.5} = \log x$

To find $\log x$, the calculator keystrokes are:

[LOG] [6] [)] [÷] [1] [•] [5] [ENTER]

The display should read 0.5187675.

Since this is the value of $\log x$, you still need to find x where $x = 10^{0.5187675}$

Without removing the answer of 0.5187675 on your display, press:

[2nd] [LOG] [2nd] [ANS] [(-)] [ENTER]

Your display should now read 3.3019272

Note: You could use the 'ln' key instead of the 'log' key – the answer would still be the same. Try it!

[LN] [6] [)] [÷] [1] [•] [5] [ENTER] [2nd] [LN] [2nd] [ANS] [(-)] [ENTER]