The Casio FX 115ES Calculator and Base e



SHIFT

(-)

ex

ln: log base e

PARENTHESIS

Many application problems require using the natural base or base e. The symbol ‘e’ represents an irrational number similar to .

**e** $≈$ **2.71828**

* Raising e to a power: SHIFT ln the power =, e5 is found by inputting: SHIFT ln 5 =,

You screen will look like: e5 148.4131591

* Raising e to a negative power: SHIFT ln (-) the power =, e-3 is found by inputting: SHIFT ln (-) 3 =,

You screen will look like: e-3 0.049787

**The inverse function for exponentials is logarithms. For base e this requires using the natural log or ln.**

* To take the natural log of a number: ln the number ) =, ln(45) is found by inputting: ln 45 ) =,

You screen will look like: ln(45) 3.80666249

**Note that the calculator inserts the left parenthesis when you input ln.**

**Remember that you can’t take the log of a negative number**

**so if you input ln(-45) you will get an error message.**

The Casio FX 115ES Calculator and Base 10



FRACTION $\frac{∎}{}$

(-)

S⬄D

log: base 10

SHIFT

10x

Many application problems require using the common base or base 10.

* Raising 10 to a power: SHIFT log the power =, 105 is found by inputting: SHIFT log 5 =,

**You screen will look like: 105 100000**

* Raising 10 to a negative power: SHIFT log (-) the power =, 10-3 is found by inputting: SHIFT log (-) 3 =,

**You screen will look like: 10-3** $\frac{1}{1000}$

**S⬄D changes the answer to a decimal 0.001**

* Raising 10 to integer powers is just a matter of moving the decimal point, so a calculator is really only needed when raising 10 to a fractional exponent.

103/4 is found by inputting: SHIFT log 3$ \left(\frac{∎}{}\right)$ 4 =,

You screen will look like:$ 10^{\frac{3}{4}}$ 5.623413252

Many applications involve using the inverse or common log (log base 10) function.

* To take the **common log** of a number: log the number ) =, log(45) is found by inputting: log 45 ) =

You screen will look like: log(45) 1.653212514

* **If you need to take the log to a base other than 10 or e, use the** $log\_{}$ **button just below the on button.**

Hence for log3(34). Input $log\_{}$ 3 right arrow 34 =,

**You screen will look like:** $log\_{3}(34)$ **3.209831677**

The Casio FX 115ES Calculator and Applications Involving Logs and Exponentials



PARENTHESES

(-)

FRACTION

SHIFT

ARROW

BASE 10

BASE e

**1. Applications involving base e:**

Population growth is given as P(t) = Poekt where Po is the original population, k is the growth rate and t is the time. Suppose you are asked to find the population after 2 years given the original population was 2500 and the growth rate is 5%. The values you have are Po = 2500, t = 2 and k = 0.05, hence input: 2500 SHIFT ln 0.05 $×$ 2 =

**You screen will look like:**$ 2500e^{0.05×2}$ **2762.927**

**2. Applications involving base 10:**

The measure of the intensity of an earthquake is given as a Richter Scale value using the equations R = log$\left(\frac{A}{P}\right)$ where A is the amplitude of the ground’s vibrations (in micrometers) and P is the time (in sec.) it takes for the ground to oscillate one time. Suppose that the ground oscillated 5000 micrometers every 0.2 sec., what is the Richter scale value? A = 5000 and P = 0.2 hence R = log$\left(\frac{5000}{0.2}\right)$.

Input: log 5000 $\frac{∎}{}$ 0.2 RIGHT ARROW ) =

You screen will look like:$log\left(\frac{5000}{0.2}\right)$ 30209831677