Scientific calculators have, among other built in functions, keys for radicals, exponentials and logarithms; in particular, most have the keys $\sqrt{x}$, $\sqrt[3]{x}$, $\sqrt[4]{y}$, $x^2$, $e^x$, $10^x$, $y^x$, LOG and LN, along with keys for the constants $e$, $\pi$, and others. Results of computations reported in exact form, like $x = \sqrt[3]{16}$, $x = \log_3 15$ or $x = e^3$, mean something to you and I, because we know about radicals, exponentials and logarithms, but mean nothing to the average person. We must learn how to give these less informed people and ourselves approximate numerical values for these numbers.

1. Use a calculator to approximate each of the following. Give the keystroke sequence you used.

For example, using my TI-36X SOLAR:

$$\log_2 7 = \frac{\log 7}{\log 2} \approx 2.807$$

(a) $\sqrt{11}$

(b) $\sqrt[3]{7}$

(c) $\frac{\log 5}{\ln 3}$

(d) $\log_5 3$

(e) $\log_2 (e^{\sqrt{2}})$
2. Solve for $x$. Give an approximate numerical value of $x$ and describe how and where you used a calculator.

(a) $x^\pi = e$

(b) $5^x = 4$

(c) $\ln x = 3.1$

(d) $3^{2x} = 7^{x+1}$

(e) $\log x - \log 12 = 15$

3. Report your answers in both exact and numerical terms.

(a) A certain population will double every 10 years. How long before there are 100 times the initial population?

(b) At a continuously compounded interest rate of 15%, what is the first year's interest on 1 million dollars?