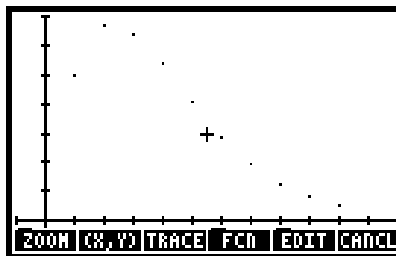


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Calculator Lesson 18

Sequences

Since a sequence can be thought of as a function with the integers greater than or equal to some starting value as its domain, it should be clear that graphing a sequence should be very similar to graphing a function. The only difference is that in the PLOT WINDOW we set Step: to 1. For example, let us plot the sequence $\frac{n^2}{2^n - 1}$ for n going from 1 to 10. Go to the PLOT SETUP window (LS(hold) 2D/3D). Make sure Type: is Function, enter $\frac{n^2}{2^n - 1}$ for Eq:, set Indep: to n, make sure Connect is not checked, set H-Tick: to 1, V-Tick to .2, and make sure Pixels is not checked. Press NXT F6-OK LS(hold) WIN to get into the PLOT WINDOW. Set H-View: from -1 to 12. You want the length of the horizontal view to be a multiple of 13 so that the integers will be on the tick marks. (See Lesson 4.) Set V-View from -0.2 to 1.4, Indep Low: to 1 and High: to 10, make Step: 1 and be sure Pixels is not checked. Now press F5-ERASE and F6-DRAW and you should see the graph shown on the right.



The calculator has an operation called lim that will take the limit of a function, or sequence. To find $\lim_{x \rightarrow a} f(x)$ place the function $f(x)$ on level 2 of the stack and the algebraic expression $x=a$ on level 1, then press LS CALC F2-LIMIT F2-lim. For example, find $\lim_{x \rightarrow 0} \frac{\sin(3x)}{5x}$. Put $\frac{\sin(3x)}{5x}$ on level 2, $x = 0$ on level 1, press LS CALC F2-LIMIT F2-lim and see the answer $\frac{3}{5}$ on the stack. To find the limit of the sequence given above, put $\frac{n^2}{2^n - 1}$ on level 2 of the stack, $n = \infty$ on level 1, and press F2-lim. The answer will be on the stack, but note that the default variable has been changed to 'n'.

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