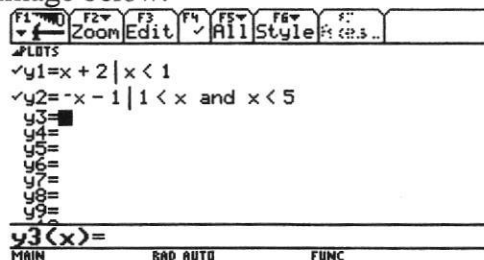


Graphing Piecewise Defined Functions

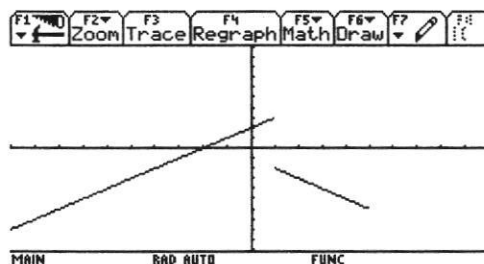
Graph $f(x) = \begin{cases} x+2, & x < 1 \\ -x-1, & 1 < x < 5 \end{cases}$. We will not worry about the point when $x = 1$ since a graphing calculator typically will not show any difference when $\leq$ is used rather than $<$.

TI-89, Voyage:

On the y menu we will enter each step of the function as a separate y value. In order to place the restrictions on the function, we will use the “with” operator. It is the symbol that looks like a vertical line, $|$. See the image below.



Note the use of the word “and” for the inequality. The calculator does not understand $1 < x < 5$ so the inequality must be written out. The graph displayed for a standard window follows.



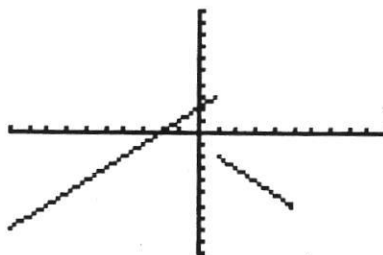
TI-83, TI84, TI86:

These calculators do not have the “with” operator shown above, but they will still use the graph. They use a logic computation where the inequality is evaluated at the x value that is being graphed. If the x value satisfies the inequality the software returns a value of 1 for “true”; if it does not satisfy the inequality a value of 0 for “false” is returned. We multiply these by the function to get the graph. The less than symbol and the word “and” are found in the “test” and “logic” menus.

```

Plot1 Plot2 Plot3
Y1=(X+2)(X<1)
Y2=(-X-1)(1<X a
nd X<5)
Y3=
Y4=
Y5=
Y6=
  
```

A typical graph follows.



Note the use of the parentheses around the function. This is needed because the graph is achieved by multiplying the function by 1 or 0. When multiplying by zero, the graph is dumped to the x axis and does not appear. The above graph was done on a TI-84 + calculator. Some calculators may show a vertical line on the end of the segments going back to the x-axis. This occurs because the mode is set to connect points and the last (or next point) is on the x axis. The newer operating systems on the graphing calculators avoid this problem; if you see the lines and would like for them not to appear, you can fix this by inserting a division sign between the two parentheses. (e.g. $(x + 2)/(x < 1)$).