



hp calculators

HP 35s Accessing the stack registers

The stack registers

Examples



The stack registers

The HP 35s uses an operational stack of four registers, called X, Y, Z and T and LASTx. In RPN mode, these registers are used to hold values for computations. In algebraic mode, these registers hold results from previous calculations.

Chapter 2 of the HP 35s User's Guide explains the RPN stack in detail. Many of these features work in algebraic mode as well.

In RPN mode, these stack registers are easily accessed using the $\boxed{\rightarrow}$ $\boxed{R\uparrow}$, $\boxed{R\downarrow}$, $\boxed{\rightarrow}$ \boxed{LASTx} and $\boxed{x\leftrightarrow y}$ keys whether in a program or in normal computations. Access to these registers within algebraic mode is essentially the same, but the way the HP 35s presents these registers to the user is slightly different.

Examples

The examples shown below indicate some of the ways the stack registers can be accessed within algebraic mode as well as using this type of access in RPN mode within programs. Many efficiencies can be achieved in RPN mode using these approaches.

Example 1: Compute $1 + 2$ then $3 + 4$ and then divide 5 by the sum of the previous two results in algebraic mode.

Solution: $\boxed{1} \boxed{+} \boxed{2} \boxed{\text{ENTER}}$



Figure 1

$\boxed{3} \boxed{+} \boxed{4} \boxed{\text{ENTER}}$



Figure 2

$\boxed{5} \boxed{\div} \boxed{\rightarrow} \boxed{() } \boxed{R\downarrow}$



Figure 3

At this point, the HP 35s displays the four level stack with the cursor beneath the Y register. This register contains the first calculation we did above (the $1 + 2$). Pressing $\boxed{\text{ENTER}}$ will copy a reference to this register back to the calculation in progress as shown below. REGY stands for "register Y."

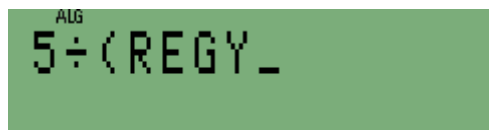


Figure 4

[+] **[R↓]** **[<]** **[ENTER]**

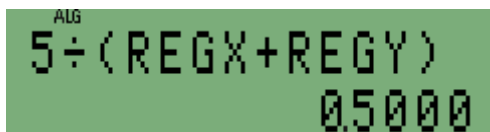


Figure 5

[+] **[R↓]** **[<]** **[ENTER]** (REGX stands for "register X.")

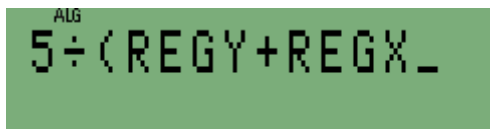


Figure 6

[ENTER] (This completes the calculation)

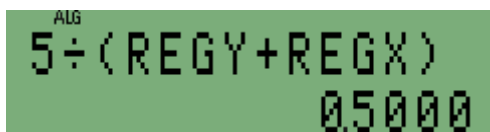


Figure 7

Answer: The answer is 0.5. The larger point is the ability to reference up to four previous results when in algebraic mode.

Example 2: In RPN mode within a program, fill the stack with 1, 2, 3, and 4. Then divide the 4 by (1+2x3), but do so without losing any of the stack register contents.

Solution: **[▶]** **[PRGM]** **[1]** **[ENTER]** **[ENTER]** **[2]** **[ENTER]** **[ENTER]** **[3]** **[ENTER]** **[ENTER]** **[4]**



Figure 8

(Note: the **[ENTER]** key is pressed twice above in order to terminate digit entry upon the first press and then to actually place an **[ENTER]** into the program when pressed the second time). At this point, the four level stack is full of the four values. If you were to attempt to enter the 7 for the division, the 1 that was entered first would disappear off the top of the stack. However, the following technique can be used to operate upon a number located in the X register without losing any values from the stack.

The technique involves rolling the value in X down to the T register and then entering an equation that operates upon the T register to perform the calculation. This can be quite an involved expression. The result will be placed into the X register and the previous contents of Y, Z, and T are preserved.

[R↓] **[EQN]**

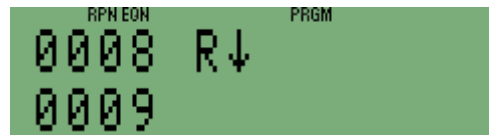


Figure 9

R↓



Figure 10

> > ENTER



Figure 11

÷ () 1 + 2 x 3

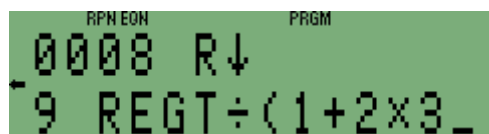


Figure 12

ENTER



Figure 13

Answer: The lines entered into this program would, when executed, take the value that was originally in X and divide it by $(1 + 2 \times 3)$ without disturbing the stack. While this is actually a mixing of algebraic features within the RPN mode, it provides HP 35s users with a tremendous ability to control the calculator.