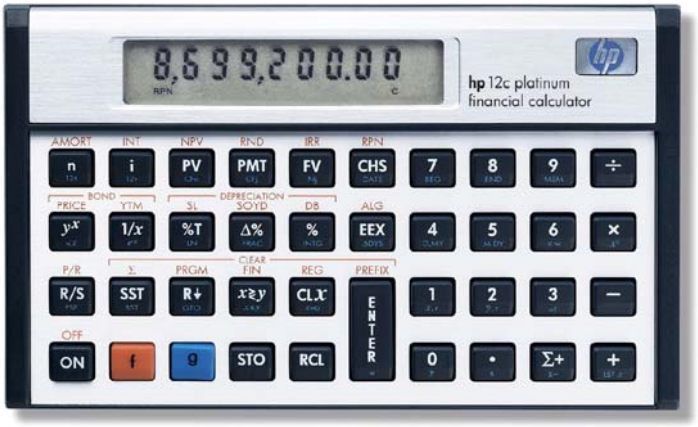
hp calculators



HP 12C Platinum
Using algebraic mode to solve problems

The HP12C Platinum algebraic mode

Practice with solving problems using algebraic mode

The HP12C Platinum algebraic mode

The HP12C Platinum contains a very flexible algebraic mode in addition to its well-known RPN mode. This algebraic mode allows for flexible solutions to many problems encountered in business and beyond.

When in normal, 'run' mode, every operation performed in the HP12C Platinum uses the display contents or places results on it. The display always shows the contents of the **X-register**. A register is a predefined place in the calculator memory that is able to hold a formatted number with a ten-digit mantissa and a two-digit exponent of ten. The X-register is one of the registers that form the algebraic stack, represented in Figure 1 with all contents cleared to zero.

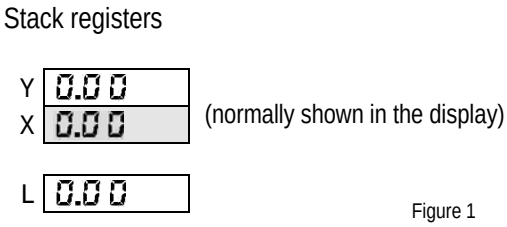


Figure 1

Anytime a number is keyed in, the X-register is updated to hold this number. It is then available for use.

Practice with solving problems using algebraic mode

Example 1: What is the most common keystroke sequence to compute the reciprocal of 7.2? What registers in the stack are used?

Solution: The most common keystroke sequence to compute the reciprocal of 7.2 is:

[7] [•] [2] [1/x]

Figure 2

In this case, simply typing in the number and pressing the related key are enough to compute the resulting value. There are other functions that use only the X-register contents, like [g] [LN] or [g] [√x]. These are the 'one-number functions', and when they are pressed, the calculator proceeds with the following operation sequence:

1. take a copy of the X-register contents and replace it with the resulting value.

Example 2: What is the most common keystroke sequence to enter 2.33 and 4.5 and add them to each other? What registers in the stack are used?

Solution: The most common keystroke sequence to add 2.33 to 4.5 is:

[4] [•] [5] [+] [2] [•] [3] [3] [=]

Answer:

Figure 3

When [=] is pressed, the calculator proceeds with the following operation sequence:

1. take a copy of the X-register contents;
2. take Y-register contents and add to X-register contents;
3. replace actual X-register contents for resulting value;

This same operational sequence is observed when [−], [X], [÷] and [y^x] are used. These are the 'two-number functions'.

Example 3: Evaluate: 3 x 4 + 5 =

Solution: [3] [X] [4] [+] [5] [=]

Answer: 17.

Example 4: Evaluate: 5 ÷ (10 – 2)

Solution: The solution below makes use of the [x≷y] key. For complicated problems, evaluating the denominator first and then pressing the [x≷y] key before allowing the division to occur is often a quick way to find a solution.

[1] [0] [−] [2] [÷] [5] [x≷y] [=]

Answer: 0.625.

Example 5: Evaluate the following expression given x=3.4567?

$$y = \sqrt{x} + 2 \times \ln(x)$$ Figure 4

Solution: [3] [•] [4] [5] [6] [7] [STO] [0] [g] [LN] [X] [2] [+] [RCL] [0] [g] [$\sqrt{x}$] [=]

Figure 5

Example 6: Evaluate: (3 + 4) x (5 + 6) =

Solution: The solution below also makes use of the [x≷y] key. This often makes solutions very easy.

[3] [+] [4] [=] [5] [+] [6] [X] [x≷y] [=]

Answer: 77.

Example 7: Evaluate: (27 – 14) ÷ (14 + 38) =

Solution: The solution below also makes use of the [x≷y] key.

[2][7][−][1][4][=][1][4][+][3][8][÷][x≷y][=]

Answer: 0.25.

Example 8: Evaluate: 23^2 – (13 x 9) + $\frac{1}{7}$ =

Solution: [1][3][x][9][+][7][1/x][=][2][3][g][x^2][−][x≷y][=]

Answer: 411.86.

Example 7: Evaluate: (14 + 12) x (18 - 12) ÷ (9 - 7) =

Solution: [1][4][+][1][2][=][1][8][−][1][2][x][x≷y][=][9][−][7][÷][x≷y][x≷y][=]

Answer: 78.