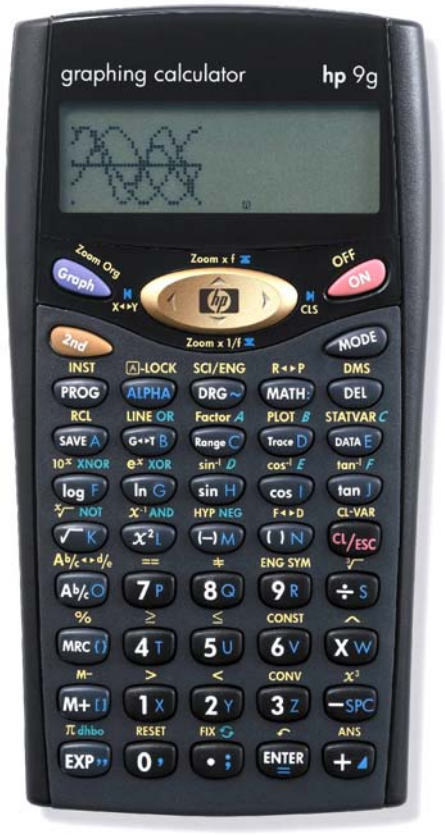
hp calculators



HP 9g Basic Arithmetic

Practice Doing Arithmetic

Practice doing arithmetic

This learning module describes how to carry out simple arithmetic calculations on your HP 9g. Since the HP 9g uses the familiar *algebraic* entry system, you don't need to learn a new method: expressions are entered in the same left-to-right order that you would write them.

We will work in MAIN mode, which is the default operating mode and where common math calculations are done. Computations in STAT mode are also possible, as well as in BaseN mode to a lesser extent, even though these modes are designed for specific purposes, which are discussed in their respective learning modules.

If MAIN mode is not already the current mode, press MODE and then press ◀ or ▶ until MAIN is selected, then press ENTER, or just press MODE 0› in a row. A blinking cursor appears at the beginning of the entry line. Keep in mind that the maximum number of characters (i.e. digits, parentheses, commands, variables) on the entry line is 76, longer calculations must be split, but they are rare anyway.

In the following examples the default display format (Floating Point) is assumed. If you have changed this format, this is the procedure to restore the default mode: press 2nd FIX . and 2nd SCI/ENG then select FLO and press ENTER. Display formats are discussed in the HP 9g learning module *Operating Modes and Display Format.*

Example 1: Add 721.07 and 223.89

Solution: Press

7P 2Y 1X . 0› 7P + 2Y 2Y 3Z . 8O 9R ENTER

The result appears below the entry line as soon as ENTER has been pressed.

Answer: 944.96

Once the HP 9g has completed a calculation, the result is stored in a special memory and can be retrieved using the Answer function (2nd ANS):

Example 2: Multiply the previous result by 5

Solution: X 5U ENTER

Notice that "Ans" appears automatically on the entry line. Pressing a number key when the result line is displayed starts a new calculation, but if you press an operator key instead, the HP 9g continues the calculation. This is called a *chain* calculation.

Answer: 47248

Example 3: Calculate $750.34 \times 36 - 25 \times 750.34 \times 36$

Solution: Since 750.34×36 appears twice in the expression, we can find it first and use the Answer function to invoke this result:

7P 5U 0› . 3Z 4T X 3Z 6V ENTER −SPC 2Y 5U 2nd ANS ENTER

Notice the *implicit* multiplication in 25 Ans: you don't need to press the [×] key.

Answer: –648293.76

Example 4: Calculate -75×45 and $4.52 \times (-7.1)$

Solution: To key in negative numbers the [(–)] key must be pressed *before* keying the number. Thus the first operation can be done this way

[(–)] [7] [5] [×] [4] [5] [ENTER]

and the second is

[4] [.] [5] [2] [×] [(–)] [7] [.] [1] [ENTER]

The parenthesis is not necessary. Bear in mind that [(–)] and [–] are *not* interchangeable. The former is a unary operator that makes numbers negative and the latter is the binary operation subtraction.

Answer: –3375 and –32.092

Results greater than 10^{10} or less than 10^{-9} are displayed in scientific notation. To key in numbers in scientific notation, first press [(–)] if the mantissa is negative, enter the mantissa (there is no need to enter it if it is 1), press [EXP], and [(–)] if the exponent is negative and finally key in the exponent.

Example 5: Calculate 1000000 ÷ 2.75

Solution: [EXP] [6] [÷] [2] [.] [7] [5] [ENTER]

Powers of ten are entered by pressing the [EXP] key . Since the mantissa is 1, it can be omitted. It is simpler to work with than 1000000 and easier than using [1] [×] [1] [0,] [2nd] [^] [6] . Here's yet another way:

[1] [2nd] [ENG SYM] [1] [÷] [2] [.] [7] [5]

The display now reads 1M/2.75. [ENTER] returns the same result. This time we have used a special symbol that the calculator recognizes as 10^6 (one *M*illion). To use a symbol in a calculation, enter the ENGSYM (for engineering symbols) menu ([2nd] [ENG SYM]), select the desired symbol and press [ENTER] or press the number associated to each symbol. There are 11 symbols which are displayed in two menus, use the [^] and [v] keys to display additional symbols. This is the complete list with their meanings: K (10^3), M (10^6), G (10^9), T (10^{12}), P (10^{15}), E (10^{18}), m (10^{-3}) , μ (10^{-6}), n (10^{-9}), p (10^{-12}) and f (10^{-15}).

Answer: 363636.3636

Parentheses are important in specifying the order of operation. Without parentheses, the HP 9g calculates according to the order of algebraic precedence. You also need to use parentheses to enclose arguments for functions, such as SIN(45), but they are automatically included along with the function name when the function key (or menu item) is pressed. Trailing parentheses that would be entered just before pressing [ENTER] may be omitted. Parentheses are entered

by pressing the (key. Both the left and right parentheses are entered at the same time, but the cursor is placed just after the left parenthesis, therefore pressing › is all it takes to close a parenthesis.

Example 6: Calculate (73 – 89) × (523 + 34)

Solution: (7 3 – 8 9 › × (5 2 3 + 3 4 ENTER

But try this:

(7 3 – 8 9 › (5 2 3 + 3 4 ENTER

Notice the implicit multiplication again! There's no need to enter the multiplication sign between parentheses or between a number and a parenthesis.

Answer: –8912

Functions within an expression are evaluated in the order of precedence stated below. As far as basic arithmetic is concerned, multiplication and division have priority over addition and subtraction.

1. Expressions within parentheses. Nested parentheses are evaluated from inner to outer. Up to 13 levels of nested parentheses are allowed in a calculation.
2. Coordinate transformations and prefix functions such as sin , cos , tan etc..
3. Postfix functions such as x^2 , 2nd x^3 etc
4. Power function (2nd ^) and $\sqrt[x]{}$ NOT
5. Fractions
6. Implicit multiplication with variables, π and RAND and RANDI: πlog2, 3Ans, etc.
7. Negation ((–))
8. Implicit multiplication in front of prefix functions, e.g. 2√3
9. nPr and nCr
10. Multiplication and division
11. Addition and subtraction
12. Relational operators (=, <, >, etc.)
13. AND and NAND
14. OR, XOR, XNOR
15. And finally the conversions 2nd $a\frac{b}{c}$ $\frac{d}{e}$, 2nd F↔D and >DMS (2nd DMS ^ ENTER).

Functions with the same precedence are evaluated in order from left to right, therefore parentheses are not required in the following example:

Example 7: Calculate $\dfrac{8/3}{5}$

Solution: 8 ÷ 3 ÷ 5 ENTER

Answer: 0.533333333

Example 8: Calculate $\dfrac{8}{3/5}$

Solution: 8 ÷ (3 ÷ 5 ENTER

Answer: 13.33333333

One of the handy features on the HP 9g is that the very last calculation can be repeated very easily –just pressing ENTER . This fact is most useful when combined with the Ans function.

Example 9: We can always add 1 by pressing two keys, but is there a way of counting by pressing a single button?

Solution: Here's a simple yet useful counting technique. Press 0 and ENTER . This stores 0 in Ans. Now press + 1 ENTER . Now each time ENTER is pressed, the result is incremented by one. Of course, several refinements are possible: we can initialize the counter to any desired number and count by a number other than one.

Example 10: Find the first five multiples of e

Solution: Repeated calculations make finding multiples of a number as easy as pressing a button. The number e is the base of the natural logarithms: press

2nd e^x 1 ENTER

This is the first multiple and is stored in Ans. Press

+ 2nd e^x 1 ENTER

The second multiple is displayed. From now on, each press of ENTER gives a multiple of e.

Answer: 2.718281828, 5.436563657, 8.154845485, 10.87312731, 13.59140914.

Not only the last calculation can be easily repeated. In fact, the HP 9g keeps a record of up to 252 characters of previous input. To access the history stack use the ▲ and ▼ arrow keys. Please note that this list is cleared when you change the operating mode. Refer to the learning module *Clearing, Editing and Correcting* for more information.