hp calculators

HP 48GII Base conversions and arithmetic

The BASE menu

Numbers in different bases

Practice working with numbers in different bases

The BASE menu

The BASE menu is the RED shifted function of the 3 key and can be accessed by pressing ↱ BASE . The screen displays the Base menu containing eleven functions for working with numbers in different bases. The first four functions allow the base to be changed to HEX for hexadecimal base 16 (which is chosen here, showing in reverse letters as choice one), DEC for decimal base 10, OCT for octal base 8, and BIN for binary base 2. The 48GII calls such numbers "binary" even if they are not in base 2. All such numbers are proceeded with the # sign in front of the number. To enter a number in the current base, press ↰ # before typing in the number.

Figure 1

Beginning with function five in the menu, there are several functions and sub-menus containing additional functions for working with binary numbers. Functions five and six convert numbers from real to binary and from binary to real. Choice seven in the menu displays a sub-menu with choices for applying logic functions to binary numbers. Choice eight displays a sub-menu for working with binary numbers at the binary bit level. Choice nine displays a sub-menu for working with binary numbers at the byte level. Choice ten and choice eleven allow for the selection of the word size. The default word size is 64 bits.

Figure 2

Numbers in different bases

Most numbers we work with day-to-day are in base 10. There are applications within the computer world that require the use of numbers in other bases. A number in base 10 of 24 can be translated into base 16 by the following procedure. Just as each digit's location in base 10 can be thought of as a power of ten (the one's place, the ten's place, the hundreds' place, etc), each digit's location in base 16 can be thought of as a power of 16. Each digit in a base ten number can hold a value from 0 to 9. In base 16, each digit can hold a value from 0 to F, where F corresponds to the value 15 in a base 10 number. Translating 24 from base 10 to base 16 would require a 1 in the second location of the base 16 number (and would convert 16 of the 24 number's value) and an 8 in the second location of the base 16 number. Therefore, 24 base 10 is equal to 18 in base 16. A similar process could be used to convert 24 base 10 to base 8 or base 2.

Basic arithmetic functions will work with numbers in different bases, but these numbers must be integers – decimals are allowed for real numbers only, not binary numbers.

Practice working with numbers in different bases

Example 1: Convert 4000 base 10 to a base 8 octal number.

Solution: First, make sure the calculator is in DEC mode to enter the base 10 number.

↱ BASE 2 ENTER ↰ # 4 0 0 0 ENTER ↱ BASE 3 ENTER

Figure 3

Answer: 7640 base 8.

Example 2: Add 7F6 base 16 to 1011001 base 2 and display the result in base 10.

Solution: First, make sure the calculator is in HEX mode to enter the base 16 number.

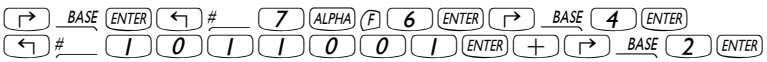

Figure 4

Answer: 2127 base 10.

Example 3: Multiply FFF base 16 by 777 base 8 and display the result as a real number.

Solution: First, make sure the calculator is in HEX mode to enter the base 16 number.

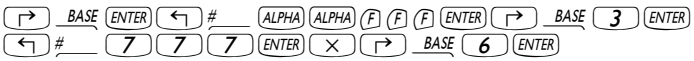

Figure 5

Answer: The result is 2,092,545.