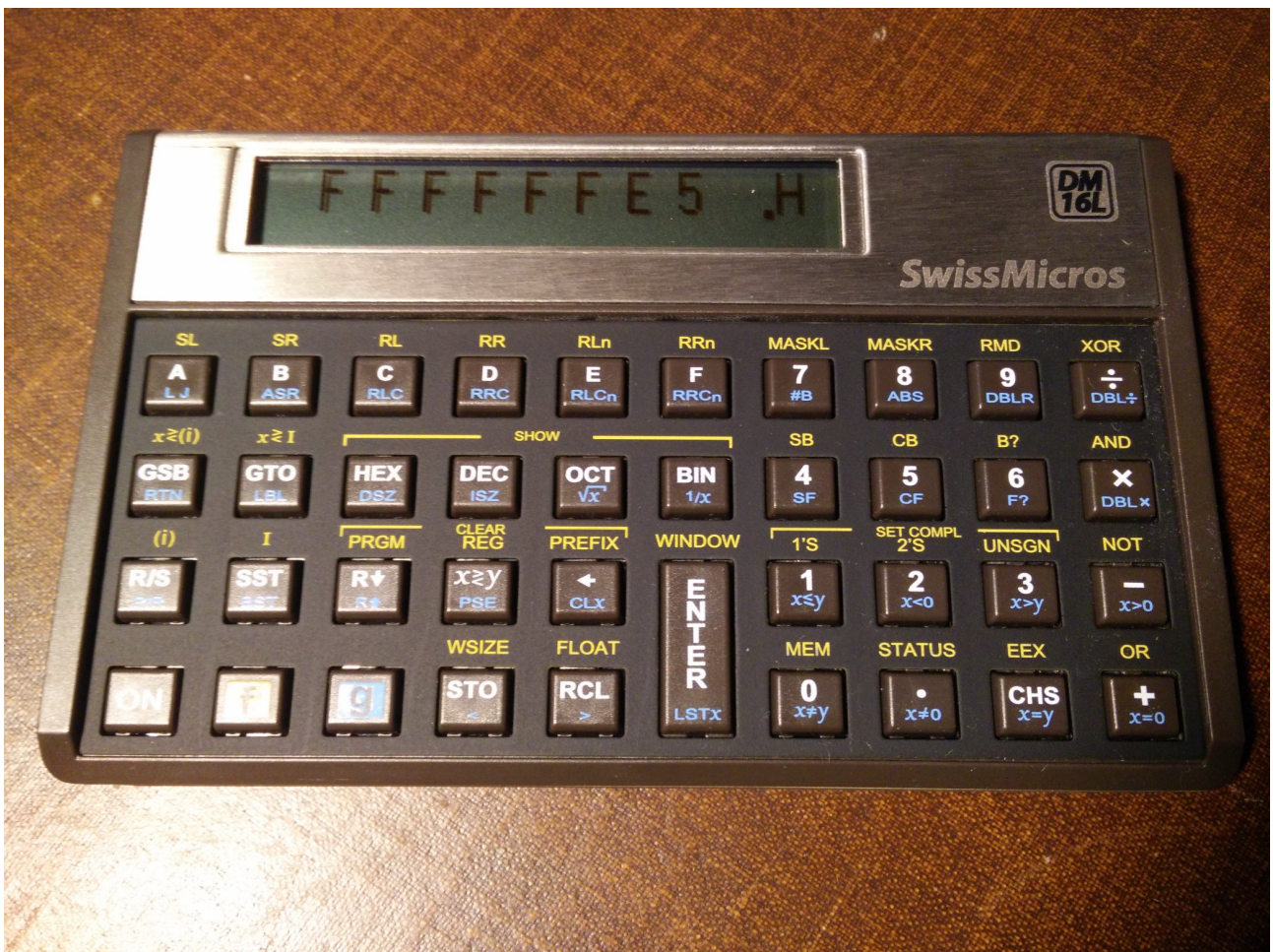


SwissMicros

DM16L PROGRAMS



Program A - Calc Net Value from Gross (20% Off)

Eg. $22,151.82 = 18,459.85$

Program B - Calc Gross Value from Net (20% On)

Eg. $18,459.85 = 22,151.82$ (Close enough!)

Program C - Calculate %Change (<https://www.mathsisfun.com/numbers/percentage-change.html>)

How to Calculate

Here are two ways to calculate a percentage change, use the one you prefer:

Method 1

Step 1: Calculate the change (subtract old value from the new value)

Step 2: Divide that change by the old value (you will get a decimal number)

Step 3: Convert that to a percentage (by multiplying by 100 and adding a "%" sign)

Note: when the new value is greater than the old value, it is a percentage increase, otherwise it is a decrease.

Method 2

Step 1: Divide the New Value by the Old Value (you will get a decimal number)

Step 2: Convert that to a percentage (by multiplying by 100 and adding a "%" sign)

Step 3: Subtract 100% from that

Note: when the result is positive it is a percentage increase, if negative, just remove the minus sign and call it a decrease.

Examples

Example: A pair of socks went from \$5 to \$6, what is the percentage change?

Answer (Method 1):

- Step 1: \$5 to \$6 is a \$1 increase
- Step 2: Divide by the old value: $\$1/\$5 = 0.2$
- Step 3: Convert 0.2 to percentage: $0.2 \times 100 = \mathbf{20\% \text{ rise}}$.

Answer (Method 2):

- Step 1: Divide new value by old value: $\$6/\$5 = 1.2$
- Step 2: Convert to percentage: $1.2 \times 100 = 120\%$ (i.e. \$6 is 120% of \$5)
- Step 3: Subtract 100%: $120\% - 100\% = 20\%$, and that means a **20% rise**.

Old 5526

New 6727

%change = 21.7336

Program D - Enters Pi Constant (Approx = 3.141592653)

Program E - $\text{margin\%} = (\text{sale price} - \text{cost})/\text{sale price}$

Eg. Cost £10. Sale Price £15. Margin = 33.3333% (Revenue = £15, Profit = £5)

10 Enter, 15 GSB E. Result = 33.3333

10 Enter, 13 GSB E. Result = 23.0769

Program F:

Eg. 8 Factorial = 40,320.

Factorials:

Appropriately for a programmer's calculator, the 16C, like all other members of the Voyager series, is itself programmable. **Keystroke programming** is used. Up to 203 program steps are available, and up to 16 program/step **labels**. Each step and label uses one byte, which consumes register space in 7 byte increments. Here is a sample program that computes the **factorial** of an integer number from 2 to 69. The program takes up 9 bytes. The codes displayed while entering the program generally correspond to the keypad row/column coordinates of the keys pressed.

To run the program, enter the argument onto the stack, then press the keystrokes GSB F. The result is displayed when the program terminates.

Program 0: [Not Available as label used internally inside Program F!]

Program 1:

Counts up in Binary from given start value. Press R/S to end.

(Recommended command SF 3 is entered first to set the "show leading zero's" flag).

Program 2:

Doubles value (Decimal). Press R/S to end.

| Step | Keystrokes (shift keys not shown) | Displayed code | Comment |
|------|--------------------------------------|----------------|--------------------------------------|
| 1 | LBL A | 43, 22, A | Calc Net From Gross (20% Off) |
| 2 | 1 | 1 | |
| 3 | . | 48 | |
| 4 | 2 | 2 | |
| 5 | / | 10 | |
| 6 | RTN | 43, 21 | |
| 7 | LBL B | 43, 22, B | Calc Gross from Net (20% On) |
| 8 | . | 48 | |
| 9 | 2 | 2 | |
| 10 | X-Y | 34 | |
| 11 | * | 20 | |
| 12 | LSTx | 43, 36 | |
| 13 | + | 40 | |
| 14 | RTN | 43, 21 | |
| 15 | LBL C | 43, 22, C | %Change old, new |
| 16 | X-Y | 34 | |
| 17 | - | 30 | |
| 18 | LSTx | 43, 36 | |
| 19 | / | 10 | |
| 20 | 1 | 1 | |
| 21 | 0 | 0 | |
| 22 | 0 | 0 | |
| 23 | * | 20 | |
| 24 | RTN | 43, 21 | |

| Step | Keystrokes (shift keys not shown) | Displayed code | Comment |
|------|--------------------------------------|----------------|---------------------------------|
| 25 | LBL D | 43, 22, D | Enter Pi Constant |
| 26 | 3 | 3 | |
| 27 | . | 48 | |
| 28 | 1 | 1 | |
| 29 | 4 | 4 | |
| 30 | 1 | 1 | |
| 31 | 5 | 5 | |
| 32 | 9 | 9 | |
| 33 | 2 | 2 | |
| 34 | 6 | 6 | |
| 35 | 5 | 5 | |
| 36 | 3 | 3 | |
| 37 | RTN | 43, 21 | |
| | | | |
| 38 | LBL E | 43, 22, E | Margin% (Cost,Price) |
| 39 | STO 0 | 44, 0 | |
| 40 | X-Y | 34 | |
| 41 | - | 30 | |
| 42 | RCL 0 | 45, 00 | |
| 43 | / | 10 | |
| 44 | 1 | 1 | |
| 45 | 0 | 0 | |
| 46 | 0 | 0 | |
| 47 | * | 20 | |
| 48 | RTN | 43, 21 | |
| | | | |
| | | | |

| Step | Keystrokes (shift keys not shown) | Displayed code | Comment |
|------|--------------------------------------|----------------|--|
| 49 | LBL F | 43, 22, F | Factorial |
| 50 | x<>I | 42, 22 | Store x in register I |
| 51 | 1 | 1 | Store 1 in x |
| 52 | LBL 0 | 43, 22, 0 | Define label 0 |
| 53 | RCL I | 45, 32 | Recall register I into x |
| 54 | * | 20 | Multiply x and y |
| 55 | DSZ | 43, 23 | Decrement register I and if not zero ... |
| 56 | GTO 0 | 22, 0 | ... go back to label 0 |
| 57 | RTN | 43, 21 | Stop program - result displayed in x |
| | | | |
| 58 | LBL 1 | 43, 22, 1 | Add 1 (Binary) |
| 59 | 1 | 1 | |
| 60 | + | 40 | |
| 61 | SHOW BIN | 42, 26 | |
| 62 | GTO 1 | 22, 1 | |
| | | | |
| 63 | LBL 2 | 43, 22, 2 | Double (Decimal) |
| 64 | 2 | 2 | |
| 65 | * | 20 | |
| 66 | SHOW DEC | 42, 24 | |
| 67 | GTO 2 | 22, 2 | |
| | | | |
| 68 | RTN | 43, 21 | Marks End. |
| | | | |
| | | | |
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