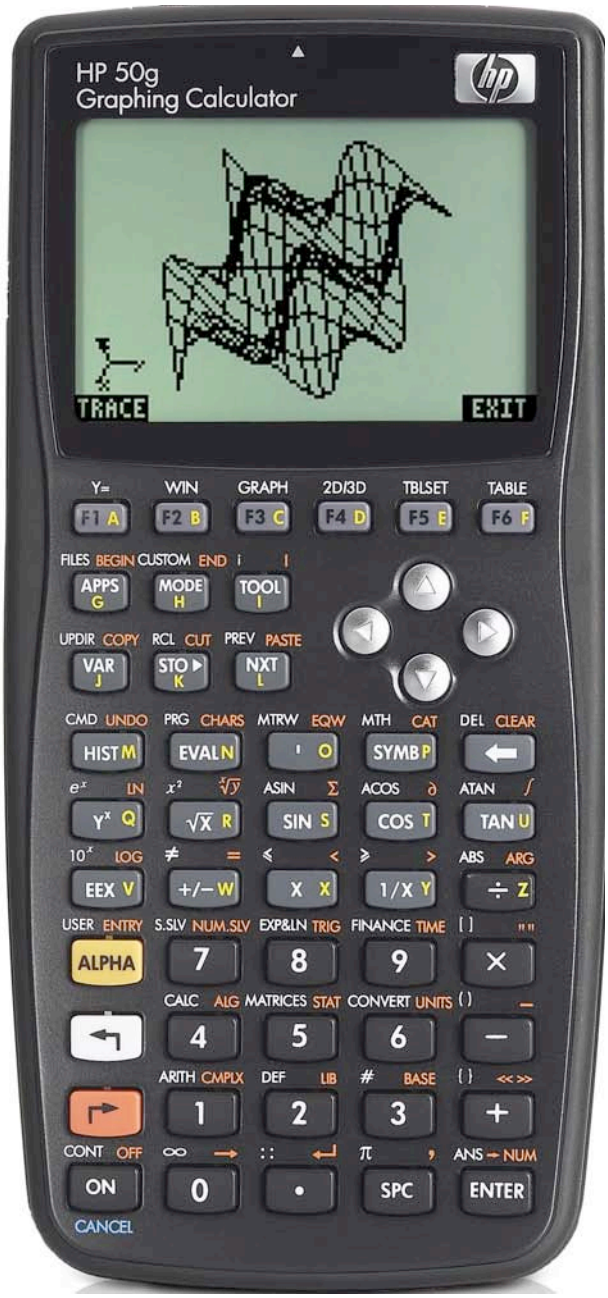
# hp calculators

**HP 50g** Using the EquationWriter

The EquationWriter

Practice using the EquationWriter to solve problems



## The EquationWriter

The EquationWriter is one of the most useful tools built into the HP 50g calculator. With it, you can work through complicated calculations and see the equation take shape before your eyes. Since the EquationWriter displays the evolving calculation in a textbook format, it is possible to easily compare the display to an equation on paper and ensure proper entry. The EquationWriter is the ORANGE shifted function of the [ ' ] key and is started by pressing [→] [EQW] . The display will now look like this:


Figure 1

The menu choice BIG above the [F3] key allows the equation being entered to be seen in a big font (indicated by the small square in the menu label) or a smaller font (indicated by the lack of a square in the menu label).

The [◀] [▼] [▲] [▶] arrow keys allow movement around the EquationWriter screen to make changes to different areas of the expression being entered. Some of these uses are illustrated by the example problems below.

## Practice using the EquationWriter to solve problems

Example 1: In an electrical circuit, four resistors are connected in parallel. Their values are 220 ohms, 560 ohms, 1.2 kilohms, and 5 kilohms. What is the total resistance of the circuit?

Solution: The total resistance is found using this formula:

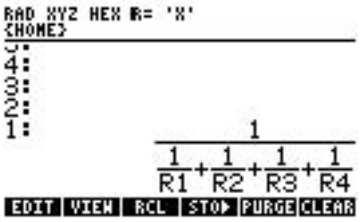



Figure 2

where R1 is the resistance of resistor 1, etc. Use the EquationWriter to find the total resistance.

[→] [EQW] [1] [÷] [1] [÷] [2] [2] [0] [▶] [+] [1] [÷] [5] [6] [0] [▶]
[+] [1] [÷] [1] [2] [0] [0] [▶] [+] [1] [÷] [5] [0] [0] [0]

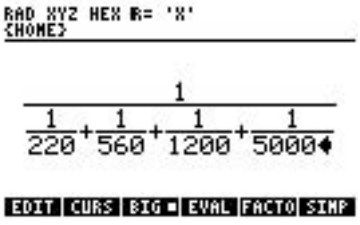



Figure 3

[ENTER]

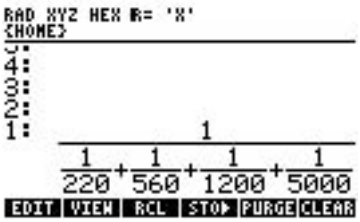



Figure 4

To convert this to a number, press ↱ →NUM .

Answer: 135.7865 ohms.

Example 2: The 1906 San Francisco earthquake, with a magnitude of 8.25 on the Richter Scale, is estimated to be 105 times greater than the Nicaragua quake of 1972. What would be the Richter Scale reading of this 1972 earthquake?

Solution: The equation relating the two earthquakes is:


Figure 5

where R1 would be the Richter scale reading of the 1972 Nicaraguan earthquake, R2 is the Richter Scale reading of the 1906 San Francisco earthquake, M2 is the magnitude of the 1906 earthquake and M1 is the magnitude of the 1972 earthquake. Since the 1906 earthquake was estimated to be 105 times greater than the 1972 earthquake, M2 will be 105 and M1 will be 1. Use the EquationWriter to find the answer.

↱ EQW 8 • 2 5 — ↱ LOG 1 0 5 ÷ 1

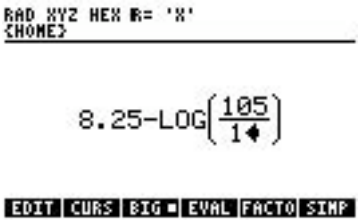



Figure 6

ENTER ↱ →NUM .


Figure 7

Answer: The 1972 earthquake's Richter Scale reading was approximately 6.23.

Example 3: What is the sum of X/2 + 2/X from X = 1 to 100?

Solution: Use the EquationWriter to find the answer. Use the ∑ function. Note that the [X] key below is the X key, not the multiply key.

[→] [EQW] [→] [Σ] [X] [▶] [1] [▶] [1] [0] [0] [▶] [X] [÷] [2] [▶] [+] [2] [÷] [X]

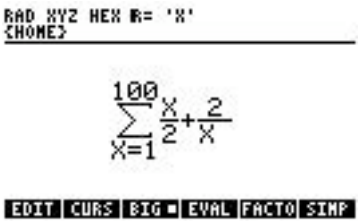



Figure 8

[ENTER] [→] [→NUM] .


Figure 9

Answer: The answer is 2,535.3748.

Example 4: The position of a projectile at time t after it was fired with an initial altitude h, initial velocity $v_0$ feet/second, and initial trajectory angle A from the horizontal axis is given by the equations:

$X = v_0\ t\ COS\ (A)$

and

$Y = h + v_0\ t\ SIN(A) - \frac{1}{2}\ g\ t^2$

where g is a constant 32 feet/second$^2$.

An object is thrown with an initial velocity of 34 feet/second. If the initial angle of the trajectory is 43 degrees and the object is released at a height of 5 feet above the ground, where is the object located after 1.25 seconds?

Solution: Use the EquationWriter to find the answer. Make sure the calculator is in degrees mode.

[MODE] [▼] [▼] [▒▒▒]

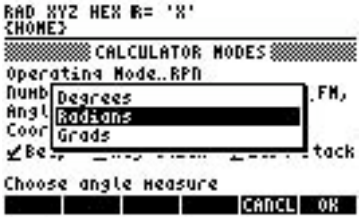



Figure 10

Press either the [▲] or [▼] keys to make sure Degrees is selected and press [▒▒▒] shown above the [F6] key.

[→] [EQW] [3] [4] [×] [1] [•] [2] [5] [×] [COS] [4] [3]

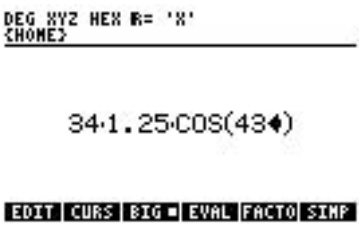



Figure 11

ENTER → →NUM


Figure 12

→ EQW BIG (to make the displayed font smaller if not already selected)

5 + 3 4 × 1 • 2 5 × SIN 4 3 ▶ ▶ —
0 • 5 × 3 2 × 1 • 2 5 $y^x$ 2

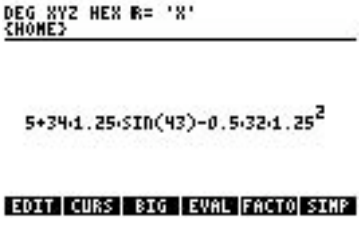



Figure 13

ENTER → →NUM .


Figure 14

Answer: The value of X is 31.0825 and the value of Y is 8.9849. The object is 31.08 feet down range and is still 8.98 feet above the horizontal ground.