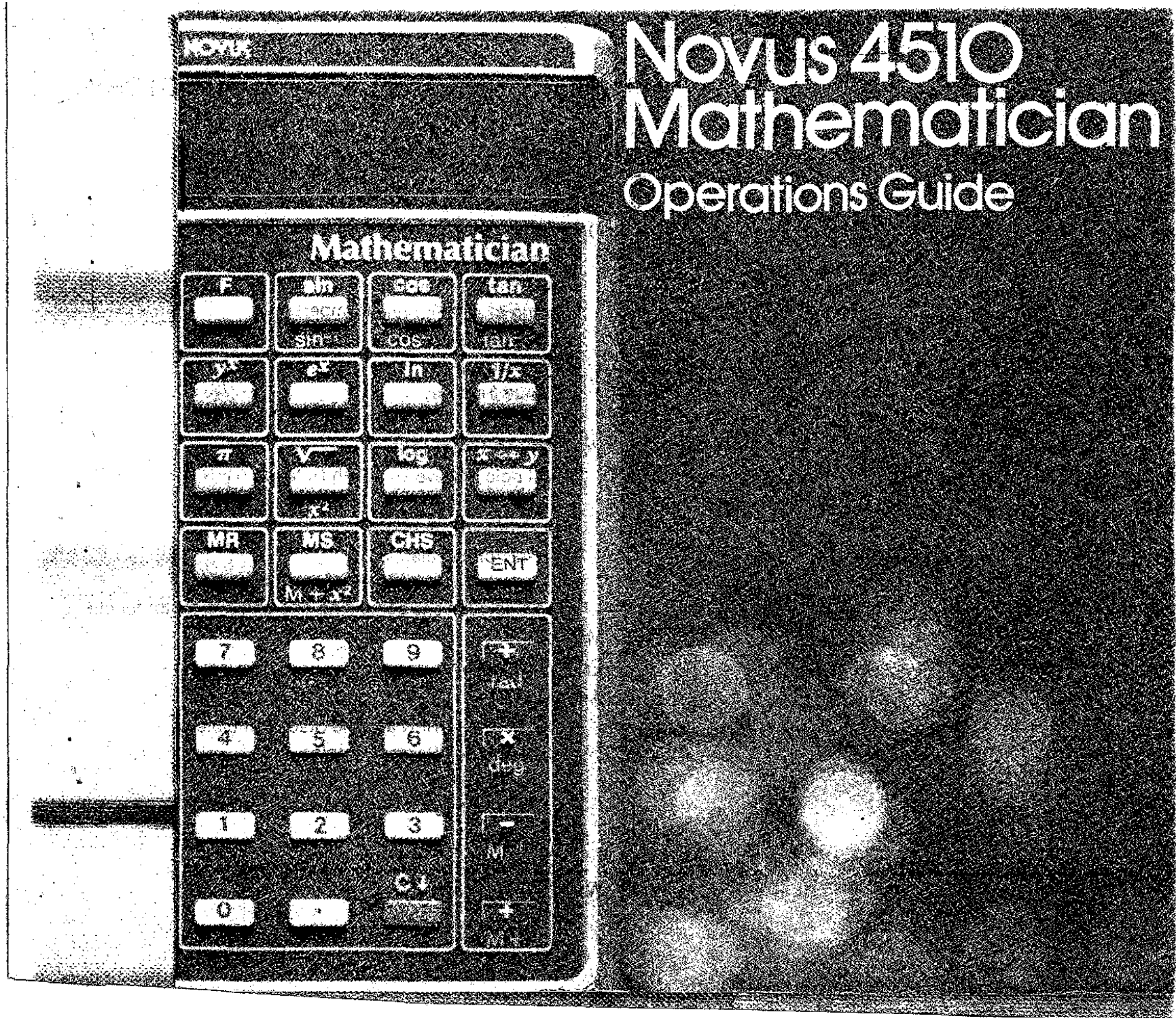
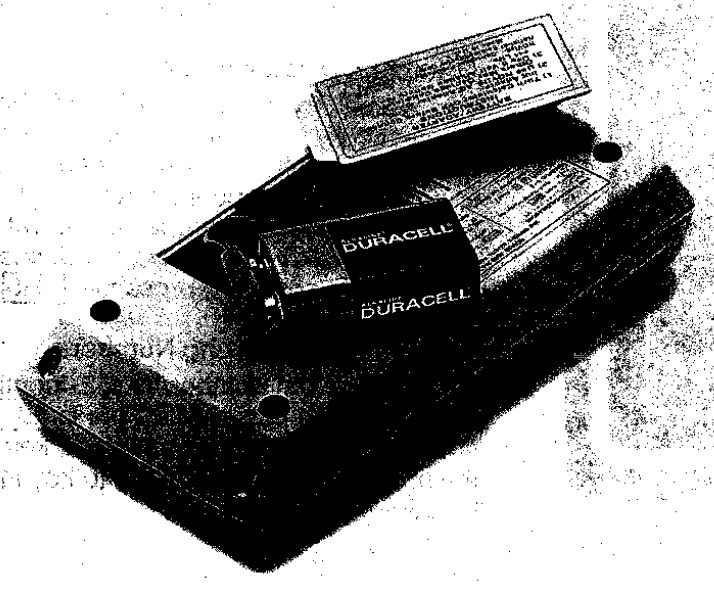


Novus 4510 Mathematician

Operations Guide

DIRECTORY



Getting Started

Turn your NOVUS Mathematician on with the switch located on the left side of the calculator. The calculator is automatically cleared and the display should now show 0. If it does not, check to be sure the battery is connected properly. (See section on battery installation).

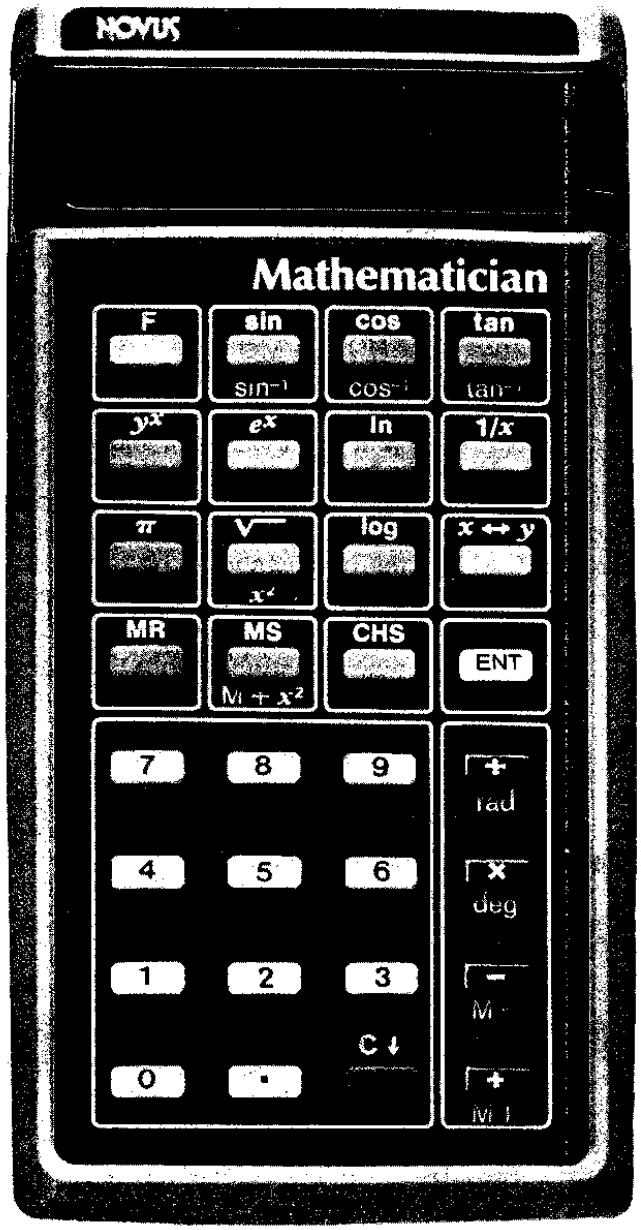
Battery Installation

Your NOVUS Mathematician is powered by a 9-volt transistor battery which should give you about two months of operation with normal use. The Mathematician will show a decimal point on the extreme left hand side of the display as a low-battery indicator. Although calculations can still be made while the low-battery indicator is on, the battery should be replaced as soon as possible. Continued use on a weak battery may result in inaccurate answers.

To change batteries, turn the machine over, place a small coin in the little slot at the top of the battery door and gently pull toward you. The battery door will slip out. BE SURE THE CALCULATOR IS TURNED OFF BEFORE REPLACING THE BATTERY OR CONNECTING IT TO THE AC ADAPTOR. Then slip the bottom of the battery door back in place and, squeezing GENTLY on the two prongs on the door, snap it back in place.

AC Adaptor

You can use your Mathematician on regular AC (mains) current by connecting the NOVUS AC adaptor to the jack at the top of the machine. BE SURE YOUR CALCULATOR IS TURNED OFF BEFORE CONNECTING THE ADAPTOR.



Keyboard Layout

Single function keys and the upper functions on double function keys have their functions defined in silver lettering above the key. They will be represented in this manual by □. Lower functions on double function keys have their functions defined in yellow lettering below the key. They will be represented in this manual by parentheses.

To access lower functions, press [F] then the desired key. If you accidentally touch [F] when you didn't want to, a touch of the [C↓] key will cancel the effect of the [F] key.

Operation

Display

The NOVUS Mathematician will accept and display any positive or negative number between 0.0000001 and 99999999. Any result larger than 99999999. will result in an overflow, indicated by all zeros and decimal points being displayed.

Negative numbers are represented by a minus sign just to the left of the number in the display.

Automatic Display Shutoff

To save battery life, the NOVUS Mathematician automatically shuts off the display and shows all decimal points if no key has been pressed for approximately 35 seconds. No data has been changed and further entries or operations will bring back the display. To restore the display without changing its contents, press the [CHS] key twice.

Keying in and Entering Numbers

To enter the first number for a 2-function calculation, key in the number and press [ENT]. If your number includes a decimal point, key it in with the number. You do not have to key in the decimal in whole numbers.

Correcting Mistakes

If you enter a wrong number, one touch of the C↓ key will clear the error and bring back the previous number. Although it is not necessary to clear the Mathematician between problems, three touches of the C↓ key will clear all except memory. If you make a mistake after touching a function key, the best way to correct your mistake is to enter the last number again and touch the opposite function. For example: If you find you have multiplied 12 by 6 when you wanted to divide 12 by 6, enter the 6 again, touch ÷ (division is the opposite of multiplication) and you are back where you started before making the mistake.

X Y Exchange

The X Y exchange key, X↔Y, allows you to exchange the contents of the display with what was last in the display.

Change Sign Key

The CHS key enables you to change the sign of the number in the display. If the number is positive, touching CHS will make it negative and vice versa. To enter a negative number, key in the number and touch CHS.

Entering π

The constant Pi (3.1415926) can be entered directly by touching the π key.

Performing Calculations

Since many people who use electronic slide rules deal with complex problems, Novus believes the calculator should not add to the complexity of the problem. Therefore, Novus selected the Reverse Polish Notation stack principle, which lets you do your problems the SAME WAY each time, no matter what the problem. In addition to the separate memory, there are three locations where numbers can be kept and operated on. These locations are called registers and in your Mathematician these have been combined into an automatic stack. (See Appendix A for a complete explanation of the stack).

The Logic of Reverse Polish Notation (RPN)

If you remember the following three steps, you will quickly master your NOVUS Mathematician and have confidence in its answers.

1. Starting at the left and working right, key in the next number (or the first number if this is the beginning of a new problem).
2. Ask yourself: "Can an operation be performed?" If yes, perform all operations possible. If no, press ENT.
3. Repeat steps 1 and 2 until your calculation is complete.

One-factor calculations

One-factor functions work directly on what is in the display, there is no need to press ENT before performing the function.

[ln]* computes the natural logarithm of any positive number in the display.

[LOG]* computes the common logarithm of any positive number in the display.

[e^x]* computes the natural antilog of the number in the display by raising the constant 'e' (2.7182818) to the power in the display.

[1/x] computes the reciprocal of the number in the display.

Example: 1/2 = 0.5.

KEY IN	DISPLAY SHOWS
2	2
[1/x]	.5

[√‾] computes the square root of any positive number in the display.

(X^2) after touching the F key, computes the square of the number in the display.

Example: $5^2 = 25$.

KEY IN	DISPLAY SHOWS
5	5
[F] (X^2)	25.

*See Appendix A for a diagram explanation of how these work on the stack.

Trigonometric functions

[SIN] computes the sine of the angle in the display.*

[COS] computes the cosine of the angle in the display.*

[TAN] computes the tangent of the angle in the display.*

* DEGREES ONLY!

Touching the F key before touching ($\sin^{-1}$), ($\cos^{-1}$) or ($\tan^{-1}$) will compute the arc sine, arc cosine or arc tangent, respectively, of the number in the display.

Example: Arc sine .5 = 30°

KEY IN	DISPLAY SHOWS
.5	.5
[F]	.5
($\sin^{-1}$)	30.

(rad) after touching the F key, converts number in the display from degrees to radians.

Example: 90° = 1.5707963 radians.

KEY IN	DISPLAY SHOWS
90	90
[F] (rad)	1.5707963

(deg) after touching the [F] key, converts number in the display from radians to degrees.

Two-factor calculations

To perform two-factor calculations, key in the first number, touch [ENT], key in the second number and touch the desired function key.

[+] adds what is in the display to what was last in the display.

Example: 2 + 3 = 5.

KEY IN	DISPLAY SHOWS
2	2
[ENT]	2.
3	3
[+]	5.

[−] subtracts what is in the display from what was last in the display.

[×] multiplies what is in the display by what was last in the display.

[÷] divides what was last in the display by what is now in the display.

Example: $12 \div 6 = 2$.

KEY IN	DISPLAY SHOWS
12	12
[ENT]	12
6	6
[÷]	2.

[Y^x]* raises the number in the display to the power now in the display.

Example: $4^4 = 256$.

KEY IN	DISPLAY SHOWS
4	4
[ENT]	4.
4	4
[y^x]	256.

Since taking the Xth root of Y is the same as raising Y to the 1/x power, to obtain roots, touch [1/x] before touching [y^x].

Example: $\sqrt[4]{256} = 4$.

KEY IN	DISPLAY SHOWS
256	256
[ENT]	256.
4	4
[1/x]	.25
[y^x]	3.999998**

Chain calculations with two-factor functions

The number in the display is always ready to have calculations performed on it. Chain problems require no forethought with RPN! Just follow the three steps of RPN.

* See appendix A for a diagram explanation of how this function works on the stack.

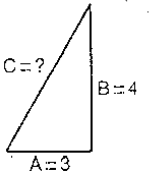
**The reason for the small variation from the absolute answer lies in that the Mathematician uses a log, antilog method of raising to powers; i.e., $y^x = e^{x \ln y}$. While $\sqrt[4]{256} = 4$, most calculators will give you 3.999998 because there is simply no 8-digit number which gives 4 when e is raised to this power.

Example: $(2 \times 3) + (4 \times 5) = 26$.

KEY IN	DISPLAY SHOWS	COMMENTS
2	2	Starting at the left, key in the first number.
[ENT]	2.	Can an operation be performed? No. Press [ENT]
3	3	Working left to right, key in the next number.
[×]	6.	Can an operation be performed? Yes. Perform the operation.
4	4	Working left to right, key in the next number.
[ENT]	4.	Can an operation be performed? No. (There aren't two factors to add together yet). Press [ENT]
5	5	Working left to right, key in the next number.
[×]	20.	Can an operation be performed? Yes. Perform all operations possible. (In this case, two: multiplication then addition).
[+]	26.	End of calculation.

Chain calculations combining one and two-factor functions

Example: If you have a right triangle with side A = 3 and side B = 4, you can find the third side using the Pythagorean theorem $\sqrt{A^2 + B^2} = C$.



Substituting: $\sqrt{3^2 + 4^2} = 5$.

KEY IN	DISPLAY SHOWS	COMMENTS
3	3	Starting at the left, key in the first number.
[F] (X^2)	9.	Can an operation be performed? Yes, squaring. Perform all operations possible.
4	4	Working left to right, key in the next number.
[F] (X^2)	16.	Can an operation be performed? Yes. Perform all operations possible. (In this case, three: squaring, addition, square root).
[+]	25.	
[$\sqrt{}$]	5.	Calculation is complete. It's that simple!

Memory

The NOVUS Mathematician has a completely independent memory which can be used to store constants for later use, for storing intermediate results or to accumulate into memory.

[MS] stores the number in the display in memory. Any previously stored number is replaced by the new number. To clear memory, enter 0 then touch [MS].

[MR] recalls the number in memory to the display.

(M+) after touching [F], touching (M+) adds the number in the display to the number in memory and leaves the sum in memory. The display remains unchanged.

(M−) after touching [F], touching (M−) subtracts the number in the display from the number in memory. The display remains unchanged.

Example: Store 12 in memory, add 6 to it, subtract 3 from it and then recall memory to see what you have. In memory: $12 + 6 - 3 = 15$.

KEY IN	DISPLAY SHOWS	COMMENTS
12	12	
[MS]	12.	Memory now has 12 stored in it, replacing what was previously in memory. Display remains unchanged.
6	6	
[F] (M+)	6.	Memory now has 18 (12 + 6) stored in it. Display remains unchanged.
3	3	
[F] (M−)	3.	Memory now has 15 (18 − 3) stored in it. Display remains unchanged.
[MR]	15.	Recall what is in memory to the display. Memory remains unchanged.

(M+X²) after touching the [F] key, squares the number in the display and adds it to the number in memory. Display remains unchanged.

Example: Sum of squares. $4^2 + 2^2 + 3^2 = 29$.

KEY IN	DISPLAY SHOWS	COMMENTS
4	4	
[F] (X^2)	16.	
[MS]	16.	Store the first number in the memory.
2	2	
[F] (M+X^2)	2.	Memory now contains 20. ($16 + 2^2$). Display remains unchanged.
3	3	
[F] (M+X^2)	3.	Memory now contains 29. ($20 + 3^2$). Display remains unchanged.
[MR]	29.	Recall what is in memory to the display. Calculation complete.

Error Conditions

Any overflow or illegal operation will cause the NOVUS Mathematician to indicate an error condition by displaying all zeros and decimal points. (See Appendix C for a complete table of illegal operations). Touching [C↓] clears the error condition and lets you start the problem over again. Touching any key EXCEPT [1/x], [÷], [LOG] or [ln] clears the error condition and assumes continuance of the calculation in progress with the number in the display being equal to zero. Memory is not affected by the error condition. If performing a function would cause the contents of memory to overflow, the error condition will be displayed and the contents of memory will remain undisturbed.

Appendices

Appendix A — RPN and the Stack Principle

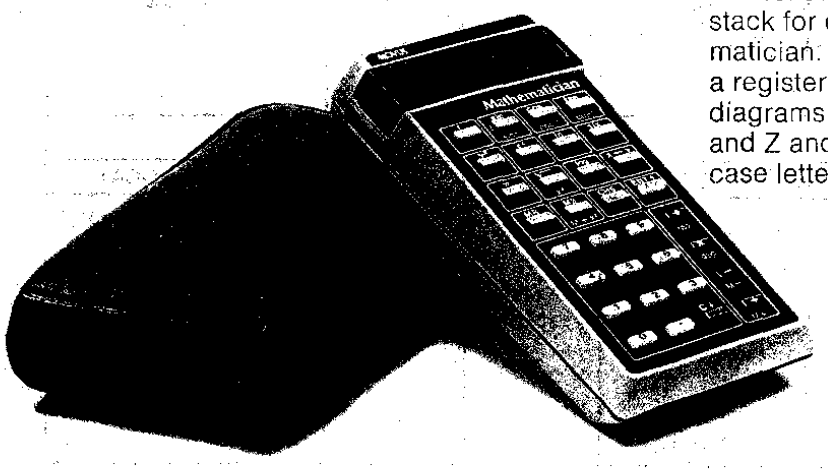
The NOVUS Mathematician uses RPN with three registers called X, Y and Z. A register is an electronic element used to store data while it is being displayed, processed or waiting to be processed. They are arranged in a stack with register X on the bottom. Register X is the displayed register.

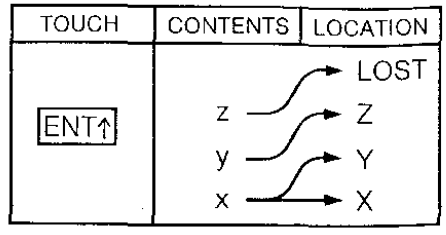
As numbers are keyed in, they go into the display (register X). When you touch ENT, the number is duplicated into register Y. At the same time, the contents of register Y are transferred to register Z and the contents of register Z are transferred out of the stack.

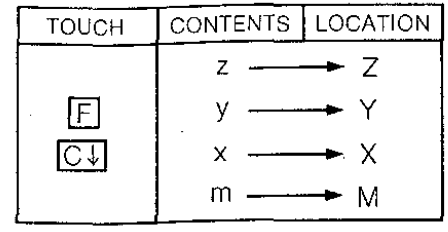
Performing an arithmetic operation (+ − × ÷) causes the contents of registers X and Y to be combined according to the operation performed and the results transferred to register X. At the same time, the contents of register Z are transferred to register Y and register Z is cleared automatically.

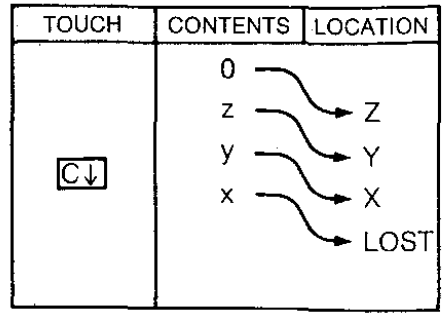
Since the memory (register M) is not affected by any operation other than specific memory functions, it is not part of the basic three-level stack.

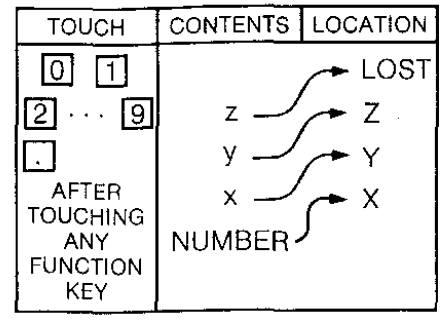
The following diagrams show what happens to the stack for each operation on the NOVUS Mathematician. To avoid confusion between the name of a register and its contents, the registers in these diagrams are represented by capital letters X, Y and Z and the contents of the registers by lower case letters x, y and z.

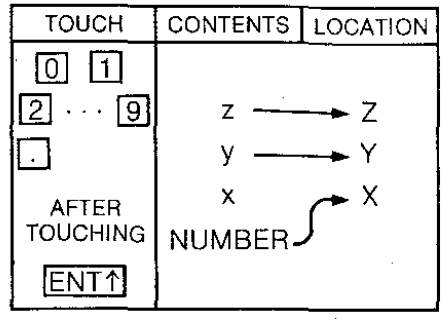


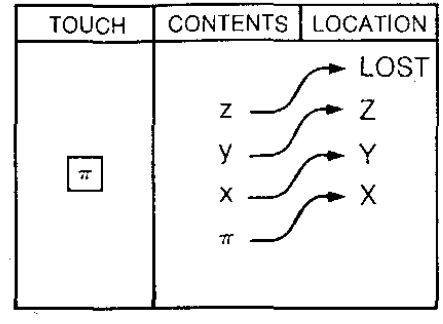

TOUCH
CONTENTS
LOCATION
ENT↑
z
y
x
LOST
Z
Y
X

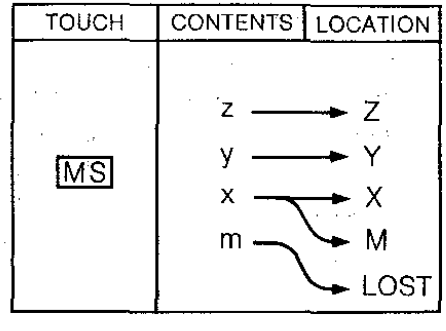

TOUCH
CONTENTS
LOCATION
F
C↓
z
y
x
m
Z
Y
X
M

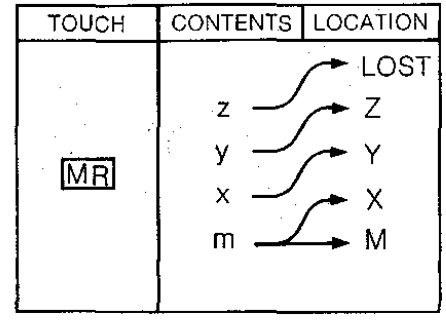

TOUCH
CONTENTS
LOCATION
C↓
0
z
y
x
Z
Y
X
LOST


TOUCH
CONTENTS
LOCATION
0
1
2 · · · 9
.
AFTER TOUCHING ANY FUNCTION KEY
z
y
x
NUMBER
LOST
Z
Y
X


TOUCH
CONTENTS
LOCATION
0
1
2 · · · 9
.
AFTER TOUCHING
ENT↑
z
y
x
NUMBER
Z
Y
X


TOUCH
CONTENTS
LOCATION
π
z
y
x
π
LOST
Z
Y
X


TOUCH
CONTENTS
LOCATION
MS
z
y
x
m
Z
Y
X
M
LOST


TOUCH
CONTENTS
LOCATION
MR
z
y
x
m
LOST
Z
Y
X
M

TOUCH	CONTENTS	LOCATION
Y^x	0 → LOST z → Z y, x → Y^x → Y x → X	

TOUCH	CONTENTS	LOCATION
SIN COS TAN ln LOG e^x	0, z → LOST, Z y → Y x → X f(x) → LOST	

*Note: Performing any trig, log or antilog function clears register Z. f(x) is transferred to register X, and register Y remains unchanged. Performing the Y^x function clears register Z. The contents of register X is transferred to register Y and Y^x is transferred to register X.

TOUCH	CONTENTS	LOCATION
1/x √	z → Z y → Y x → X f(x) → LOST	

TOUCH	CONTENTS	LOCATION
F (X^2)	z → Z y → Y x → X x^2 → LOST	

TOUCH	CONTENTS	LOCATION
F ($\sin^{-1}$) or ($\cos^{-1}$) or ($\tan^{-1}$)	0, z → LOST, Z y → Y x → X f(x) → LOST	

TOUCH	CONTENTS	LOCATION
F (rad) or (deg)	z → Z y → Y x, f(x) → X, LOST (RADIANS TO DEGREES OR DEGREES TO RADIANS)	

TOUCH	CONTENTS	LOCATION
[F] (M+X²)	z → Z y → Y x → X m → M M+X² → LOST	

TOUCH	CONTENTS	LOCATION
[F] (M+) (M−)	z → Z y → Y x → X m → f(x) → M LOST f(x): m + x → M m − x → M	

TOUCH	CONTENTS	LOCATION
[X↔Y]	z → Z y → Y x → X	

TOUCH	CONTENTS	LOCATION
[+] [−] [×] [÷]	0 → Z z → Z y → Y x → f(x) → X	

f(x): y + x → X
y − x → X
y × x → X
y ÷ x → X

TOUCH	CONTENTS	LOCATION
ERROR INDICATION	0 → LOST z → Z y → Y x → X 0 → LOST m → M	

Appendix B — Some Examples

Mathematics

Example: Sum of products
$(2 \times 3) + (4 \times 5) = 26$

KEY IN	DISPLAY SHOWS
2	2
[ENT]	2.
3	3
[×]	6.
4	4
[ENT]	4.
5	5
[×]	20.
[+]	26.

Here is what happens in the stack for
$(2 \times 3) + (4 \times 5) = 26$

K	2	ENT↑	3	×	4	ENT↑	5	×	+
Z						6	6		
Y		2	2		6	4	4	6	
X	2	2	3	6	4	4	5	20	26
M									

Example: Product of sums
$(2 + 3) \times (4 + 5) = 45$

KEY IN	DISPLAY SHOWS
2	2
[ENT]	2.
3	3
[+]	5.
4	4
[ENT]	4.
5	5
[+]	9.
[×]	45.

Here is what happens in the stack for
$(2 + 3) \times (4 + 4) = 45$

K	2	ENT↑	3	+	4	ENT↑	5	+	×
Z						5	5		
Y		2	2		5	4	4	5	
X	2	2	3	5	4	4	5	9	45
M									

Example: Convert the rectangular coordinates $X = 6$, $Y = 8$ to polar coordinates R and θ.

Using the formulae: $R = \sqrt{X^2 + Y^2}$ and $\theta = \tan^{-1}(Y/X)$

KEY IN	DISPLAY SHOWS	COMMENTS
6	6	X coordinate.
[ENT]	6.	
[ENT]	6.	Transfer contents of register Y to register Z to save for use in calculating θ.
[×]	36.	
8	8	Y coordinate.
[MS]	8.	Save for use in calculating θ.
[F] (X^2)	64.	
[+]	100.	$X^2 + Y^2$
[$\sqrt{\ }$]	10.	R calculated.
[X↔Y]	6.	Exchange to bring X coordinate back to register X.
[MR]	8.	Recall Y coordinate.
[X↔Y]	6.	Exchange to divide Y by X.
[÷]	1.3333333	
[F] ($\tan^{-1}$)	53.1301	θ calculated.

Note: To see R again, touch X↔Y

Here is what happens in the stack for $R = \sqrt{6^2 + 8^2}$ and $\theta = \text{TAN}\ (8/6)$

K	6	ENT	ENT	×	8	MS	F	X^2	+	$\sqrt{\ }$	X↔Y	MR	X↔Y	÷	F	TAN^{-1}
Z			6		6	6	6	6				10	10			
Y		6	6	6	36	36	36	36	6	6	10	6	8	10	10	
X	6	6	6	36	8	8	8	64	100	10	6	8	6	1.33	1.33	53.13
M						8	8	8	8	8	8					

Although most problems can be solved in the straightforward left to right method discussed under "The Logic of RPN," thinking through the problem and planning in advance can lead to some shortcuts. Here is an example of a shortcut method of solving the problem.

Convert the rectangular coordinates X = 6, Y = 8 to polar coordinates R and Θ.

KEY IN	DISPLAY SHOWS	COMMENTS
0	0	
[MS]	0.	Clear memory.
8	8	Y coordinate.
[F] (M+x²)	8.	Store y^2 in memory.
6	6	X coordinate.
[F] (M+x²)	6.	Add x^2 to y^2 in memory.
[÷]	1.3333333	Compute tan Θ = y/x.
[F] tan	53.1301	Θ calculated.
[MR]	100.	Recall $x^2 + y^2$.
[√]	10	R calculated.

Note: To see Θ again, touch Y →Y

Example: Find the cotangent, secant and cosecant of 30°. Using the formulae:

$$\cot = \frac{1}{\tan}, \sec = \frac{1}{\cos}, \csc = \frac{1}{\sin}$$

KEY IN	DISPLAY SHOWS	COMMENTS
30	30	
[MS]	30.	Store for further use without having to re-enter.
[TAN]	.5773502	
[1/x]	1.732051	COTANGENT 30°
[MR]	30.	Re-enter 30°
[COS]	.8660255	
[1/x]	1.1547004	SECANT 30°
[MR]	30.	Re-enter 30°
[SIN]	.5	
[1/x]	2.	COSECANT 30°

Example: Find the arc cotangent of 1.7320508.
arc cot 1.7320508 = 30°

KEY IN	DISPLAY SHOWS
1.7320508	1.7320508
[1/x]	.57735027
[F]	.57735027
($\tan^{-1}$)	30.

Example: Find the sine of 1.5707963 radians.

KEY IN	DISPLAY SHOWS
1.5707963	1.5707963
[F] (deg)	89.999999
[SIN]	1.

Engineering

Example: What is the equivalent resistance of a 10-ohm, 15-ohm and 20-ohm resistor connected in parallel?

Using the formula:

$$R_{eq} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

Substituting:

$$R_{eq} = \frac{1}{\frac{1}{10} + \frac{1}{15} + \frac{1}{20}} = 4.6153847$$

KEY IN	DISPLAY SHOWS
10	10
[1/x]	.1
15	15
[1/x]	.0666666
[+]	.1666666
20	20
[1/x]	.05
[+]	.21666666
[1/x]	4.6153847

Example: Calculate the percentage by weight of 10 grams of a substance with normality of 0.15 in 45 milliliters of standard solution with mew of 0.03646.

Using the formula: $\%wt = \frac{(mew) \times N \times V \times 10^2}{W}$

where: %wt = percentage by weight
mew = millequivalent weight of the substance
N = normality of the substance
V = volume of standard solution in milliliters, and
W = weight of sample in grams.

Substituting:

$$\%wt = \frac{0.03646 \times 0.15 \times 45 \times 10^2}{10} = 2.46105$$

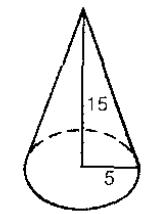
KEY IN	DISPLAY SHOWS
.03646	.03646
[ENT]	.03646
.15	.15
[×]	.005469
45	45
[×]	.246105
10	10
[F] (X^2)	100.
[×]	24.6105
10	10.
[÷]	2.46105

Example: Compute the area of a cone with radius 5 and height 15.

Using the formula: $A = \pi R \sqrt{R^2 + H^2} + \pi R^2$

Substituting: $A = \pi \times 5 \times \sqrt{5^2 + 15^2} + \pi \times 5^2$
$= 326.9045$

KEY IN	DISPLAY SHOWS
[π]	3.1415926
ENT	3.1415926
5	5
[×]	15.707963
5	5
[F] (X^2)	25.
15	15
[F] (X^2)	225.
[+]	250.
[√]	15.811388
[×]	248.36469
[π]	3.1415926
[ENT]	3.1415926
5	5
[F] (X^2)	25.
[×]	78.539815
[+]	326.9045



Although most problems can be solved in the straightforward left to right method discussed under "The Logic of RPN," thinking through the problem and planning in advance can lead to some shortcuts. Here is an example of a shortcut method of solving the problem.

Compute the area of a cone with radius 5 and height 15.

KEY IN	DISPLAY SHOWS
0	0
[MS]	0.
[π]	3.1415926
5	5
[F] ($M+x^2$)	5.

[×]	15.707963
[π]	3.1415926
[MR]	25.
[×]	78.539815
[X↔Y]	15.707963
15	15
[F] (M+x²)	15.
[C↓]	15.707963
[MR]	250.
[√‾]	15.811388
[×]	248.36469
[+]	326.9045

Example: If the internal pressure of a tank of gas at 295°K is 1500 psi, what is the pressure if the temperature is raised to 303°K?

Using the formula:

$$P_2 = \frac{P_1 T_2}{T_1} = \frac{1500 \times 303}{295} = 1540.6779 \text{ psi.}$$

KEY IN	DISPLAY SHOWS
1500	1500
[ENT]	1500.
303	303
[×]	454500.
295	295
[÷]	1540.6779

Example: What is the equivalent impedance of a 325-ohm resistor and a 15.2-millihenry inductor at a frequency of 1500 Hz?

Using the formula: $Z_{eq} = R/\theta$ where

$$\theta = \arctan \frac{2\pi fL}{R} = \arctan \frac{2 \times \pi \times 1500 \times .0152}{325}$$

$$= 23.78739° \text{ and}$$

$$R = \frac{2\pi fL}{\sin \theta} = 355.17239$$

KEY IN	DISPLAY SHOWS	COMMENTS
2	2	
[ENT]	2.	
[π]	3.1415926	
[×]	6.2831852	
1500	1500	
[×]	9424.7778	
.0152	.0152	
[×]	143.25662	
[MS]	143.25662	Since you're going to use $2\pi fL$ again to calculate R, store it for further use.
325	325	
[÷]	.4407896	
[F] ($\tan^{-1}$)	23.78739	θ calculated.
[SIN]	.4033439	
[MR]	143.25662	Recall $2\pi fL$
[X↔Y]	.4033439	Exchange X and Y registers so you can divide what was last in display by what is now in display.
[÷]	355.17239	R calculated.

Example: Find the volume of a sphere whose radius is 6.25.

Using the formula: $V = \frac{4}{3}\pi R^3$

Substituting: $V = \frac{4}{3} \times \pi \times (6.25)^3 = 1022.6532$

KEY IN	DISPLAY SHOWS	COMMENTS
4	4	
[ENT]	4.	
3	3	
[÷]	1.3333333	
[π]	3.1415926	
[×]	4.18879	
[MS]	4.18879	Store the intermediate result for further use. Remember that Y^X function clears register Z.

6.25	6.25	
[ENT]	6.25	
3	3	
[Y^x]	244.1405	
[MR]	4.18879	Recall the intermediate result.
[×]	1022.6532	

Finance

Example: How much do you have to put in the bank for it to be worth $25,000 in 10 years if the interest rate is 8.5% per year?

Using the formula: $PV = \frac{FV}{(1+i)^n}$

where: PV = present value
FV = future value
i = interest rate (in decimal)
n = number of years.

Substituting: $PV = \frac{25000}{(1+.085)^{10}} = \$11057.15$

KEY IN	DISPLAY SHOWS	COMMENTS
1	1	
[ENT]	1.	
.085	.085	
[+]	1.085	
10	10	
[Y^x]	2.26098	
25000	25000	
[X↔Y]	2.26098	
[÷]	11057.152	

Example: If you invest $10,000 now at an interest rate of 8.5% per year, how much will your money be worth in 10 years?

Using the formula: $FV = (1+i)^n \times PV$

where: FV = future value
PV = present value
i = interest rate (in decimal)
n = number of years.

Substituting: $FV = (1+.085)^{10} \times 10{,}000$
$= \$22609.80$

KEY IN	DISPLAY SHOWS	COMMENTS
1	1	
[ENT]	1.	
.085	.085	
[+]	1.085	
10	10	
[Y^x]	2.26098	
10000	10000	
[×]	22609.8	

Appendix C — Operating Limits

CONDITIONS FOR ERROR INDICATION

FUNCTION	CONDITION (X = contents of register X)
+, −, ×, ÷	$X > 99999999$
÷, 1/x	$\|X\| \leq 0.00000001$
$\sqrt{x}$	$X < 0$
Y^x	$Y \leq 0$; $18.42060 < X$ in $Y < -28$
LOG X, Ln x	$X \leq 0$
e^x	$18.42068 < X < -28$
SIN, COS	$X \geq 7$ radians, $X \geq 401°$
TAN	$\|X\| \geq 90°$, $X \geq 7$ radians
SIN^{-1}, COS^{-1}	$X > 1$
TAN^{-1}	$X > 99999999$

Consumer Warranty

NOVUS Model 4510

NOVUS, the consumer products division of National Semiconductor Corporation, is proud to guarantee your electronic calculator to be free from defects in workmanship and materials for a period of one year from the date of your purchase. Defects caused by abuse, accidents, modifications, negligence, misuse or other causes beyond the control of NOVUS are, of course, not covered by this warranty, nor are batteries. Should the calculator prove defective within 30 days of purchase, NOVUS will repair or, at its discretion, replace it free of charge. If the defect occurs after 30 days from date of purchase, a charge of $3.50 will be made for handling and insurance. If your calculator becomes defective after the one-year period, NOVUS will make repairs for a nominal charge of $15.50. Simply mail it prepaid and insured with your check or money order to the nearest NOVUS service center. Repair prices are subject to change without notice. Please do not send or include cash. Make your check or money order payable to NOVUS. Upon receipt, your calculator will be promptly serviced and returned to you freight prepaid.

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NOVUS Mathematician

NOTE: Any key referring to 'x' is referring to the number NOW in the display.
Any key referring to 'y' is referring to the number LAST in the display.

F – accesses lower functions (the functions with yellow lettering) on the keys.

sin – computes the sine of the angle in the display.
sin⁻¹ – computes the inverse sine (arc sine) of the number in the display.

cos – computes the cosine of the angle in the display.
cos⁻¹ – computes the inverse cosine (arc cosine) of the number in the display.

tan – computes the tangent of the angle in the display.
tan⁻¹ – computes the inverse tangent (arc tangent) of the number in the display.

y^x – raises 'y' to the 'x' power.

e^x – computes the natural antilogarithm of the number in the display (raises e = 2.718281 to the 'x' power).

ln – computes the natural logarithm of the number in the display.

1/x – computes the reciprocal of the number in the display (divides 1 by 'x').

π – enters Pi (π) = 3.1415926 into the display.

$\sqrt{x}$ – computes the square root of the number in the display.
x^2 – squares the number in the display.

log – computes the common logarithm of the number in the display.

x ⇄ y – exchanges the number now in the display with the number last in the display.

MR – recalls the contents of memory to the display.

MS – stores the number in the display in memory.
M + x² – adds the square of the number in the display to the contents of memory.

CHS – changes the sign of the number in the display.

ENT ↑ – enters the number in the display into a working register ('y').

÷ rad – divides 'y' by 'x'.
– converts the number of degrees in the display to radians.

× deg – multiplies 'y' by 'x'.
– converts the number of radians in the display to degrees.

− M− – subtracts 'x' from 'y'.
– subtracts the number in the display from the contents of memory.

+ M+ – adds 'x' to 'y'.
– adds the number in the display to the contents of memory.