MITS

SCIENTIFIC CALCULATOR

Operation Manual

7440

This publication discusses the operation of the MITS 7440 Scientific Calculator. The machine employs an algebraic entry system including parentheses with two-deep nesting and features all the commonly used transcendental functions (sin, cos, tan, arc sin, arc cos, arctan, ln, log, e^x). Numerical entries may be made from the keyboard in either floating point format (ten digits) or scientific notation (ten-digit mantissa and a two-digit exponent).

Operation of the machine is discussed in the following manner. First each of the key functions is explained and its operation illustrated by a simple example. Then the display, various error conditions and indications, and calculator accuracy are briefly discussed. Finally a series of sample problems (of varying complexity) is presented to illustrate how to use the machine in solving typical scientific or engineering calculations.

In working the examples given in this section, you may make an erroneous keyboard entry which will cause the symbol ⌜ or ⊧ to be displayed at the left-most digit of the display. This indicates that an error has been made (what constitutes an error will be discussed later in the manual). If this occurs during the execution of the examples, clear the machine by pressing [C] and re-enter the example.

ENTRY KEYS

Floating Point Entry

[0] [1] [2] [3] [4] [5] [6] [7] [8] [9]

These keys are used to enter numerical data into the machine. The data is displayed right-hand justified and previously entered digits shift one place to the left as each new digit is entered. The decimal point can be positioned anywhere within nine digit positions by pressing [·] at the position desired.

For example, enter 1234567890

PRESS	DISPLAY
[C]	0.
[1]	1.
[2]	12.
[3]	123.
[4]	1234.
[5]	12345.
[6]	123456.
[7]	1234567.
[8]	12345678.
[9]	123456789.
[0]	1234567890.

Enter 58.25

PRESS	DISPLAY
[C]	0.
[5]	5.
[8]	58.
[·]	58.
[2]	58.2
[5]	58.25

Scientific Notation Entry

Entries may be made in scientific notation with a ten-digit mantissa (maximum) and a two-digit exponent by using the ENTER EXP key. The mantissa is entered just as a floating point number; then the ENTER EXP key is pressed. Subsequent number entries from the keyboard are then entered as exponents. Entries are from right to left and there is no limit on the number of entries. The exponent assumes the value of the last two digits entered.

For example, enter 1×10^{35}

PRESS	DISPLAY
[C]	0.
[1]	1.
[ENTER EXP]	1. 00
[3]	1. 03
[5]	1. 35

Enter 2.997935 X 10^8

PRESS	DISPLAY
[C]	0.
[2]	2.
[•]	2.
[9]	2.9
[9]	2.99
[7]	2.997
[9]	2.9979
[3]	2.99793
[5]	2.997935
[ENTER EXP]	2.997935 00
[8]	2.997935 08

CHG SIGN

The CHG SIGN key is used to enter a negative number in the display. It can be used to enter a negative number or a negative exponent if scientific notation is being used. To enter a negative number, enter the number and then press CHG SIGN. Subsequent depressions of the key cause the sign to change back and forth from positive to negative.

For example, enter -25

PRESS	DISPLAY
[C]	0.
[2]	2.
[5]	25.
[CHG SIGN]	- 25.

PRESS	DISPLAY
CHG SIGN	25.
CHG SIGN	- 25.

To enter a number with a negative exponent, press the CHG SIGN key after the exponent has been entered.

6.62554×10^{-27}

PRESS	DISPLAY
C	0.
6	6.
•	6.
6	6.6
2	6.62
5	6.625
5	6.6255
4	6.62554
ENTER EXP	6.62554 00
2	6.62554 02
7	6.62554 27
CHG SIGN	6.62554 -27

Subsequent depressions of the CHG SIGN key will change the sign of the exponent back and forth from positive to negative....

PRESS	DISPLAY
CHG SIGN	6.62554 27
CHG SIGN	6.62554 -27

When entering a negative number with a negative exponent, press the CHG SIGN key before pressing the ENTER EXP key. Press it again after entering the exponent to make the exponent negative.

For example, -6.673×10^{-8}

PRESS	DISPLAY
[C]	0.
[6]	6.
[·]	6.
[6]	6.6
[7]	6.67
[3]	6.673
[CHG SIGN]	- 6.673
[ENTER EXP]	- 6.673 00
[8]	- 6.673 08
[CHG SIGN]	- 6.673 -08

[π]

The π key enters the constant 3.141592654 (accurate to ten digits) in the display.

[C] [CE]

The clear key [C] clears all the calculator logic and all registers except the memory register. It should be used whenever a new problem is started. The clear entry key, [CE] , clears the display (register) and allows a new entry to begin. It is used to clear an erroneous entry without disturbing the other calculator registers.

For example, if you want to multiply 8 X 9 = 72, but press 6 rather than 9, [CE] is used....

PRESS		DISPLAY
[C]		0.
[8]		8.
[X]		8.
[6]	(error)	6.
[CE]		0.
[9]	(correction)	9.
[=]		72.

The CE key also allows the previously entered operation to be be changed at the discretion of the operator. You may over-ride the last operation key that was pressed prior to the entry which is cleared by the CE key.

For example, suppose you want to multiply 8 X 9 = 72 but press + rather than X, CE is used...

[C]		0.
[8]		8.
[+]	(error)	8.
[9]		9.
[CE]		0.
[X]		0.
[9]		9.
[=]		72.

Thus, the CE key may be used to correct an erroneous data entry or an erroneous arithmetic keystroke without disturbing a chain calculation.

[x⇄y]

This key exchanges the relative position of two numbers with respect to an operation entered; 2 ÷ 1 becomes 1 ÷ 2 if the x⇄y key is pressed just prior to pressing the [=] key.

For example,

PRESS	DISPLAY
[C]	0.
[2]	2.
[÷]	2.
[1]	1.
[x⇄y]	2.
[=]	0.5

This is useful in chain operations when operands get out of order. For example, suppose 45 is stored in memory and 9 is in the display as the result of a series of calculations and we need 45 ÷ 9 = 5.....

PRESS	DISPLAY
[C]	0.
[4]	4.
[5]	45.
[=]	45.
[M]	45.
[9]	9.
[÷]	9.
[M]	45.
[x⇄y]	9.
[=]	5.

[(] [)]

The parentheses are used in complex problems to define variables prior to execution of the arithmetic functions or the x^y function. The parentheses keys are pressed in the same sequence that the problem is written.

For example, $\frac{4 X 5}{(2 + 3)} = 4$

PRESS	DISPLAY
[C]	0.
[4]	4.
[X]	4.
[5]	5.
[÷]	20.
[(]	0.
[2]	2.
[+]	2.
[3]	3.
[)]	5.
[=]	4.

Parentheses may be nested up to two deep. Attempts to nest parentheses beyond two deep will cause an error indication. (┌ in the left-most digit)

For example, $\frac{1}{((2 + 3)^2 + (1 + 4)^2)} = .02$

[C]	0.
[1]	1.
[÷]	1.
[(]	0.
[(]	0.

PRESS	DISPLAY
[2]	2.
[+]	2.
[3]	3.
[x^y]	5.
[2]	2.
[)]	24.9999999
[+]	24.9999999
[(]	0.
[1]	1.
[+]	1.
[4]	4.
[x^y]	5.
[2]	2.
[)]	24.9999999
[)]	49.9999998
[=]	2.000000008 -02

ARITHMETIC FUNCTIONS

[+] [-] [X] [÷]

These keys cause the indicated functions to be performed on two numbers entered from the keyboard. The machine operates in an algebraic mode so the entry keys and arithmetic functions keys are pressed in the same order as the problem would be written.

Addition

256 + 72 = 328

PRESS	DISPLAY
[2]	2.
[5]	25.
[6]	256.
[+]	256.
[7]	7.
[2]	72.
[=]	328.

Subtraction

56 - 25 = 31

PRESS	DISPLAY
[C]	0.
[5]	5.
[6]	56.
[-]	56.
[2]	2.
[5]	25.
[=]	31.

Multiplication

23 X 12 = 276

PRESS	DISPLAY
[C]	0.
[2]	2.
[3]	23.
[X]	23.
[1]	1.
[2]	12.
[=]	276.

Division

4539 ÷ 51 = 89

[C]	0.
[4]	4.
[5]	45.
[3]	453.
[9]	4539.
[÷]	4539.
[5]	5.
[1]	51.
[=]	89.

All results of the arithmetic functions will have the algebraically correct sign.

For example, 89 - 121 = -32

PRESS	DISPLAY
[C]	0.
[8]	8.
[9]	89.
[-]	89.
[1]	1.
[2]	12.
[1]	121.
[=]	- 32.

(-27) X (3) = (-81)

PRESS	DISPLAY
[C]	0.
[2]	2.
[7]	27.
[CHG SIGN]	- 27.
[X]	- 27.
[3]	3.
[=]	- 81.

Any of the arithmetic functions may use floating point data entries, scientific notation data entries, or some combination of both. The machine will display the results of these operations in either floating point format or scientific notation according to the following criteria:

1. All numbers larger than $(1 \times 10^{10}) - 1 = 9,999,999,999$ will be automatically displayed in scientific notation.

$$9999999999 + 1 = 10000000000 = 1 \times 10^{10}$$

PRESS	DISPLAY
[C]	0.
[9]	9.
[9]	99.
[9]	999.
[9]	9999.
[9]	99999.
[9]	999999.
[9]	9999999.
[9]	99999999.
[9]	999999999.
[9]	9999999999.
[+]	9999999999.
[1]	1.
[=]	1. 10

2. All numbers smaller (in absolute value) than $0.000000001 = 1 \times 10^{-9}$ will be automatically displayed in scientific notation.

$$(10^{-9}) - (10^{-18}) = 0.999999999 \times 10^{-9}$$

[C]	0.
[0]	0.
[.]	0.
[0]	0.0
[0]	0.00
[0]	0.000

PRESS	DISPLAY
[0]	0.0000
[0]	0.00000
[0]	0.000000
[0]	0.0000000
[0]	0.00000000
[1]	0.000000001
[-]	0.000000001
[ENTER EXP]	1. 00
[1]	1. 01
[8]	1. 18
[CHG SIGN]	1. -18
[=]	9.99999999 -10

3. Any number which requires ten or more digits to be expressed precisely will be automatically displayed in scientific notation. For example, 1/3 (0.33333333 33....) cannot be expressed precisely as a decimal number with a finite number of digits. Therefore, the calculator will display this number as $3.333333333 \times 10^{-1}$ which fully utilizes the ten digits of the mantissa to obtain the maximum precision possible.

$$1 \div 3 = 0.333333333$$

PRESS	DISPLAY
[C]	0.
[1]	1.
[÷]	1.
[3]	3.
[=]	3.333333333 -01

FUNCTION KEYS

[√X]

√X calculates the square root of the number in the display.

$\sqrt{169} = 13$

PRESS	DISPLAY
[C]	0.
[1]	1.
[6]	16.
[9]	169.
[√X]	13.

[1/X]

1/X calculates the reciprocal of the number in the display.

$1/8 = 0.125$

PRESS	DISPLAY
[C]	0.
[8]	8.
[1/X]	0.125

[X^Y]

X^Y raises the number in the display to a power. The power may be an integer or fraction, positive or negative.

$8^2 = 64$

PRESS	DISPLAY
[C]	0.
[8]	8.
[X^Y]	8.
[2]	2.
[=]	64.

$(32)^{.2} = 2$

PRESS	DISPLAY
[C]	0.
[3]	3.
[2]	32.
[X^Y]	32.
[·]	0.
[2]	0.2
[=]	2.

$(2)^{-2} = .25$

PRESS	DISPLAY
[C]	0.
[2]	2.
[X^Y]	2.
[2]	2.
[CHG SIGN]	- 2.
[=]	0.25

[e^X]

e^X raises e (2.718281828 - base for natural logarithms) to the power in the display.

$e^3 = 20.08553691$

PRESS	DISPLAY
[C]	0.
[3]	3.
[e^X]	20.08553691

lnX

The lnX key calculates the natural logarithm of the number in the display.

$\ln 5 = 1.609437912$

PRESS	DISPLAY
C	0.
5	5.
lnX	1.609437912

$\log_{10}X$

The $\log_{10}X$ key calculates the logarithm to the base ten of the number in the display.

$\log_{10} 500 = 2.698970004$

C	0.
5	5.
0	50.
0	500.
$\log_{10} X$	2.698970004

Trigonometric Functions

[DEG RAD]

The DEG/RAD key is used to determine which mode, degrees or radians, the machine will be operating in while performing trigonometric functions. The machine operates initially in the degrees mode, but the radians mode may be selected by pressing the DEG/RAD key. A small indicator light lights at the left of the display [•] when the machine is in the radians mode. Any subsequent depressions of the key cause the mode to change back and forth. The key does not convert a number in the display from degrees to radians or vice-versa.

PRESS	DISPLAY
Turn the power switch off, then on again....unit in degree mode	0.
[DEG RAD]	• 0.
[4]	• 4.
[5]	• 45.
[DEG RAD]	45.

[sin]

The sin key calculates the sine of the number in the display. Calculations may be in either the degree or radian mode.

sin 45° = 0.70710678 (If the red indicator light is on, press the DEG/RAD key to select the degree mode)

PRESS	DISPLAY
[C]	0.
[4]	4.
[5]	45.
[sin]	0.70710678

cos

The cos key calculates the cosine of the number in the display. Calculations may be in either the degree or radian mode.

$\cos \pi/6 = 0.866025403$ (If the red indicator light is <u>not</u> on, press the DEG/RAD key to select the radian mode)

PRESS	DISPLAY
C	• 0.
π	• 3.141592654
÷	• 3.141592654
6	• 6.
=	• 5.235987756 -01
cos	• 0.866025403

tan

The tan key calculates the tangent of the number in the display.

$\tan 60° = 1.7320508$ (If the red indicator light is on, press the DEG/RAD key to select the degree mode)

PRESS	DISPLAY
C	0.
6	6.
0	60.
tan	1.7320508

arc

The arc key is a prefix to the trigonometric function keys and when pressed with one of those keys, calculates the inverse function ($\sin^{-1}$, $\cos^{-1}$, or $\tan^{-1}$).

arc sin of -.5 = -30° (If the red indicator light is on, press the DEG/RAD key to select the degree mode.)

PRESS	DISPLAY
C	0.
·	0.
5	.5.
CHG SIGN	- .5.
arc	- .5
sin	- 30.

DISPLAY

The display consists of fourteen digits: ten of these are used for the magnitude of the number (a mantissa); two are used for the exponent; one is used for the sign of the exponent; and one is used for the sign of the number. The left-most digit, which gives the sign of the number, is also used as an error indicator. The error indication is Γ (for a positive number) and F (for a negative number). The conditions which will cause an error indication are discussed below. There is also a small indicator light to the left of the left-most digit. When this is lighted, it indicates the calculator is in the radian mode of operation; when it is not lighted, the machine is in the degree mode.

In order to obtain the maximum precision from the ten-digit display, the machine will display decimal fractions which are not exact in scientific notation. For example, the fraction 2/3 is .6666666666.....

PRESS	DISPLAY
[C]	0.
[2]	2.
[÷]	2.
[3]	3.
[=]	6.666666666 -01

To force a floating point display, use the following key sequence.....

[+]	6.666666666 -01
[1]	1.
[-]	1.666666667
[1]	1.
[=]	0.666666667

ERROR CONDITIONS

Certain conditions give rise to errors which are indicated by the left-most digit of the display. These fall into two classes: overflow or underflow and illegal operations.

Overflow or underflow occur when the calculator attempts to display numbers outside its range: that is, numbers larger than $(10 - 10^{-9}) \times 10^{99}$ or smaller (in absolute value) than 1×10^{-99}. These may occur either when entering a number or as the result of a calculation.

For example, $10^{99} \times 10 = 10^{100}$

PRESS	DISPLAY
[C]	0.
[ENTER EXP]	1. 00
[9]	1. 09
[9]	1. 99
[X]	1. 99
[1]	1.
[0]	10.
[=]	⌜ 1. 00

Certain mathematical operations are considered "illegal" in the sense that they are undefined (for real numbers). These include:

-- division by zero (0)
-- square root of a negative number
-- $\log_{10}$ or ln of a negative number or zero

Attempts to perform these will result in an error indication. For example,

$\sqrt{-4}$

[C]	0.
[4]	4.
[CHG SIGN]	- 4.
[√X]	⌜ 0.

ACCURACY

It should be noted that certain key functions do not yield exact results. Specifically these are the sin, cos, tan, $\log_{10}x$, and x^y keys. For example $2^2 = 4$, but the x^y key will yield 3.99999999

PRESS	DISPLAY
[C]	0.
[2]	2.
[x^y]	2.
[2]	2.
[=]	3.99999999

The magnitude of the error here is one part in one-hundred million (10^8) which should be accurate enough for any scientific or engineering calculation.

To understand the effect of this type of inaccuracy on a more complex calculation, we refer you to sample problem #7 in the book. This problem may be calculated by squaring the numbers exactly instead of using the x^y key. If this is done, the following value of θ will be obtained.

$$\theta_{(exact)} = 12.5288077$$

If this is compared with the value in the problem

$$\theta_{(approximate)} = 12.5288074$$

the difference is 0.0000003 or less than one part in three million (3×10^6).

Memory

The [M] key is used to store and recall data, using the memory register. The memory may be used to store intermediate answers or to store a constant that will be used repeatedly in a series of problems. To store a number in the memory register, use the [=] [M] key sequence; this causes the number in the display to be stored in memory. Any number previously stored in memory is automatically cleared when a new number is stored.

For example, to store π in memory:

PRESS	DISPLAY
[C]	0.
[π]	3.141592654
[=]	3.141592654
[M]	3.141592654

To recall a number from memory, press the [M] key.

[C]	0.
[M]	3.141592654

Note that the [C] key does not clear the memory. To clear the memory, it is necessary to store the number zero (0) in the memory register. This can be done, using the key sequence [0] [=] [M] . (The memory also is automatically cleared when the machine is powered up.)

When a number is recalled from memory, it appears to the calculator just as a keyboard entry would. Thus the memory can be used in conjunction with any of the other calculator functions by substituting the [M] key in the appropriate place for a keyboard entry.

For example, consider the equation $y = cx$ where $c = 23.7$ (a constant). Given a series of values for x, evaluate the corresponding values for y.

$x_1 = 38.2$ $y_1 =$
$x_2 = 27.5$ $y_2 =$
$x_3 = 15.8$ $y^3 =$

Store the constant

[C]	0.
[2]	2.
[3]	23.

PRESS	DISPLAY
[·]	23.
[7]	23.7
[=]	23.7
[M]	23.7

Evaluate y_1

PRESS	DISPLAY
[C]	0.
[3]	3.
[8]	38.
[·]	38.
[2]	38.2
[X]	38.2
[M]	23.7
[=]	905.34

Evaluate y_2

PRESS	DISPLAY
[C]	0.
[2]	2.
[7]	27.
[·]	27.
[5]	27.5
[X]	27.5
[M]	23.5
[=]	651.75

Evaluate y_3

PRESS	DISPLAY
[C]	0.
[1]	1.
[5]	15.
[·]	15.
[8]	15.8
[X]	15.8
[M]	23.7
[=]	374.46

SAMPLE PROBLEMS

1. Find the reactance of a 50µf capacitor at 50 Hz, using the formula

$$X_C = \frac{1}{2\pi fc}$$

PRESS	DISPLAY
[C]	0.
Enter f = 50	50.
[X]	50.
[π]	3.141592654
[X]	157.0796327
Enter 2	2.
[X]	314.1592654
Enter 50 X 10^{-6}	50. -06
[=]	1.570796327 -02
[1/X]	63.66197722

2. Find $\sin(\sqrt{\frac{1}{x^3}})$ where x = 4°

PRESS	DISPLAY
[C]	0.
Enter 4	4.
[x^y]	4.
Enter 3	3.
[=]	63.9999999
[1/X]	1.562500002 -02
[$\sqrt{X}$]	0.125
[sin]	2.1816593 -03

3. Using the equation $V = V_0 \varepsilon^{-t/rc}$, find V if

$t = .001$ second
$r = 100$ ohms
$c = 10\mu f$
$V_0 = 50$ volts

PRESS	DISPLAY
[C]	0.
Enter .001	0.001
[CHG SIGN]	- 0.001
[÷]	- 0.001
[(]	0.
Enter 100	100.
[X]	100.
Enter 10 X 10^{-6}	10. -06
[)]	0.001
[=]	- 1.
[e^x]	3.678794412 -01
[X]	3.678794412 -01
Enter 50	50.
[=]	18.39397206

4. Solve the following quadratic equation for both roots.

$$3x^2 + 6x + 2 = 0 = ax^2 + bx + c$$

Given that $a = 3$, $b = 6$, $c = 2$

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

	PRESS	DISPLAY
	[C]	0.
	Enter 6	6.
	[X]	6.
	Enter 6	6.
b^2	[-]	36.
	[(]	0.
	Enter 4	4.
	[X]	4.
	Enter 3	3.
	[X]	12.
	Enter 2	2.
	[)]	24.
$b^2 - 4ac$	[=]	12.
$\sqrt{b^2 - 4ac}$	[√X]	3.464101615
	[=]	3.464101615
Save $\sqrt{b^2 - 4ac}$	[M]	3.464101615
-b	Enter -6	- 6.
	[+]	- 6.
	[M]	3.464101615
Divide by 2a	[÷]	- 2.535898385
	[(]	0.

	PRESS	DISPLAY
	Enter 2	2.
	[X]	2.
	Enter 3	3.
	[)]	6.
First Root	[=]	- 4.226497308 -01
-b	Enter -6	- 6.
	[-]	- 6.
	[M]	3.464101615
Divide by 2a	[÷]	- 9.464101615
	[(]	0.
	Enter 2	2.
	[X]	2.
	Enter 3	3.
	[)]	6.
Second Root	[=]	- 1.577350269

5. Calculate the gain in decibels at the frequency $f = f_0$ if the input is three volts and the output is 255 volts. The gain in decibels is given by

$$GDB = 20 \log_{10} \frac{V_0}{V_1} \quad \text{where } V_0 = 255 \quad V_1 = 3$$

PRESS	DISPLAY
[C]	0.
Enter 255	255.
[÷]	255.
Enter 3	3.
[=]	85.
[log₁₀x]	1.929418926
[X]	1.929418926
Enter 20	20.
[=]	38.58837852

6. Calculate the pressure of an ideal gas if

$\rho = 0.00238$ slugs/ft^3
$T = 70° F = 530° R$
$R = 1715$ ft^2/sec^2 - °R

$$p = \rho RT$$

PRESS	DISPLAY
[C]	0.
Enter 0.00238	0.00238
[X]	0.00238
Enter 530	530.
[X]	1.2614
Enter 1715	1715.
[=]	2163.301

7. Given the two vectors

$$\bar{V}_1 = 3\bar{i} + 6\bar{j}$$

$$\bar{V}_2 = 2\bar{i} + 8\bar{j}$$

Compute the angle between $\bar{V}_1$ and $\bar{V}_2$.

NOTE: $\vec{V} = \bar{V}$ (Vector)

$|\vec{V}| = V$ (Magnitude only)

Procedure:

Compute the scalar product $\bar{V}_1 \cdot \bar{V}_2$. Then the angle between the vectors is given by:

$$\theta = \text{arc cos}\left[\frac{\bar{V}_1 \cdot \bar{V}_2}{V_1 V_2}\right]$$

Where $\bar{V}_1 \cdot \bar{V}_2 = (3)(2) + (6)(8)$

$$V_1 = \sqrt{3^2 + 6^2}$$

$$V_2 = \sqrt{2^2 + 8^2}$$

The following steps will be used (parentheses shown where they are required):

a. Compute the scalar product and store it in memory:

$$\bar{V}_1 \cdot \bar{V}_2 = (3 \times 2) + (6 \times 8)$$

b. Compute the product of the vector magnitudes:

$$V_1 V_2 = [\sqrt{(3^2) + (6^2)}\,] \times [\sqrt{(2^2) + (8^2)}\,]$$

c. Divide the scalar product by the product of the magnitudes and take the arc cos.

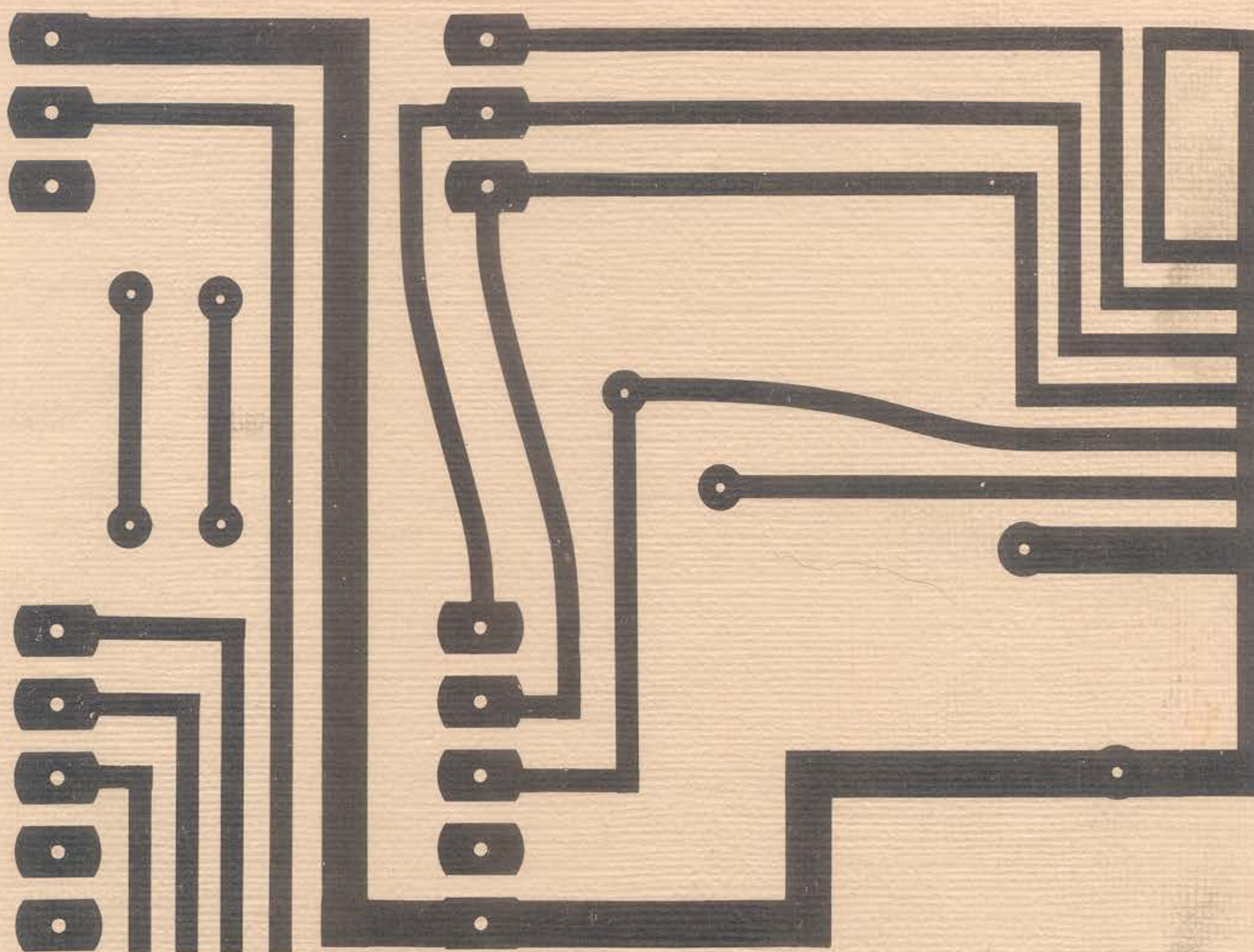
PRESS	DISPLAY
[C]	0.
[(]	0.
Enter 3	3.
[X]	3.
Enter 2	2.

	PRESS	DISPLAY
	[ )]	6.
	[+]	6.
	[( ]	0.
	Enter 6	6.
	[X]	6.
	Enter 8	8.
	[ )]	48.
Scalar prod.	[=]	54.
Store scalar prod. in memory	[M]	54.
	[C]	0.
	[( ]	0.
	[( ]	0.
	Enter 3	3.
	[x^y]	3.
	Enter 2	2.
	[ )]	9.
	[+]	9.
	[( ]	0.
	Enter 6	6.
	[x^y]	6.
	Enter 2	2.
	[ )]	35.9999999
	[ )]	44.9999999
	[$\sqrt{x}$]	6.708203925
	[X]	6.708203925

	PRESS	DISPLAY
	(	0.
	(	0.
	Enter 2	2.
	x^y	2.
	Enter 2	2.
	)	3.99999999
	+	3.99999999
	(	0.
	Enter 8	8.
	x^y	8.
	Enter 2	2.
	)	64.
	)	67.99999999
	$\sqrt{x}$	8.24621125
Prod. of vector magnitudes	=	55.31726667
	÷	55.31726667
	M	54.
	$x \rightleftarrows y$	55.31726667
	=	9.761870614 -01
	arc	9.761879614 -01
θ	cos	12.5288074

8. Calculate the antilog of 2.

	PRESS	DISPLAY
	[C]	0.
	Enter 2	2.
	[x^y]	2.
	Enter 10	10.
	[x⇄y]	2.
Antilog 2	[=]	100.



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