Hewlett-Packard

HP·10

Owner's Handbook
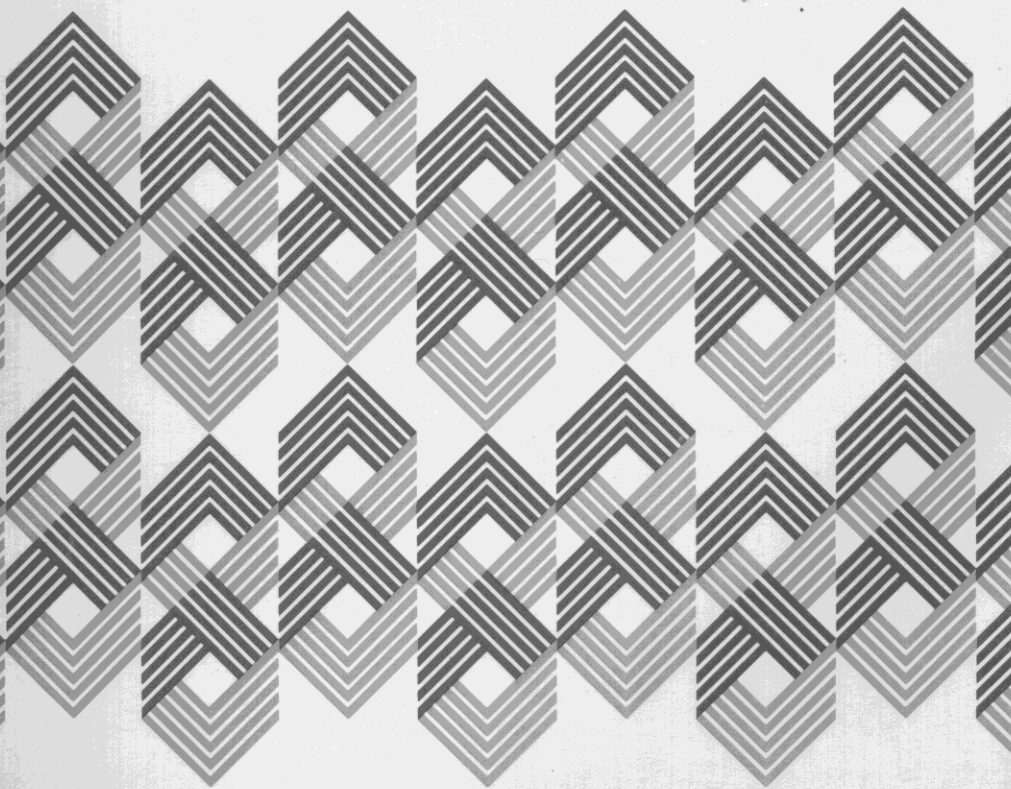
HEWLETT **hp** PACKARD

HP-10
Owner's Handbook

June 1977

Contents

Introduction

The human mind is a paradox. It can store billions of facts and make critical judgements to solve complex problems several times a day; but when it comes to using numbers, civilized man is ill-adapted to work with them. Ask a master chess player to multiply 137 × 23.64, and chances are he'll need a pencil and paper to figure it out.

So, it makes sense in this electronic age to let machines do the arithmetic, the "number-sorting," and let people do what they do best—making decisions, understanding concepts, and thinking up new ideas.

With your HP-10 Handheld Printing Calculator, you have formed a very advantageous partnership. The HP calculator deals with numbers quickly and accurately, leaving you free to concentrate on more important tasks. Since so much of our civilization does deal with numbers, isn't it smart to let a machine do such uninspiring work as adding columns of figures, calculating discounts, and performing long division? Over one million people throughout the world are already using Hewlett-Packard calculators to become more efficient and more productive.

To get the most from your HP-10, take the time to read through this handbook and work the sample problems. This easy-to-learn calculator will help solve most of your daily business and bookkeeping problems, so let's get started...

HP-10
Keyboard Index

672.00 -%
672.00 x
8. %=
53.76
618.24 -%

-10.12345678

OFF ▮▮▮ ON   DISPLAY ▮▮▮ PRINT
                         ALL

CM	C
⌂	M+	M-	MR	CE
	%	÷	×	# S
7	8	9	T
4	5	6	−
1	2	3	+ =
0	•	

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6
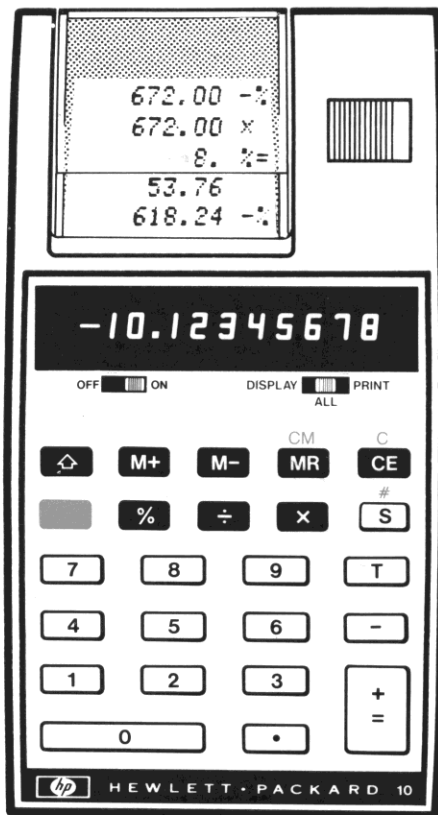
OFF ▮▮▮▮ ON Power Switch **(page 9).**

DISPLAY ▮▮▮▮ PRINT
ALL
Mode Switch **(page 9).**

⬖ Paper advance, steps paper forward one line at a time **(page 9).**

M+ Adds displayed number to number in memory and stores total **(page 30).**

M− Subtracts displayed number from number in memory **(page 30).**

MR Recalls number in memory **(page 30).**

CM Clears memory **(page 11).**

CE Clear entry, clears the number in the display **(page 11).**

C Clear all, clears the entire calculator **(page 11).**

■ Prefix key to select alternate function in gold above a key **(page 10).**

% Calculates percentages **(page 39).**

× **÷** Multiplication and division **(page 13).**

S Subtotals sums **(page 11).**

Prints display entry if ■S is pressed; prints a line of crosshatches if ■T is pressed **(page 9).**

7 8 9 Numerical
4 5 6 digits
1 2 3 **(page 10).**
0 •

T Totals sums, then clears the accumulator **(page 11)**

− Subtraction **(page 11).**

± Addition; also an equals key for multiplication and division calculations **(page 11, 13).**

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Arithmetic Calculations

Your HP-10 handheld printing calculator is shipped fully assembled. You can begin using your calculator immediately by connecting the recharger to it and to an ac outlet. **If you want to use your HP-10 on battery power alone, you should charge the battery for 6 hours first.** Whether you operate from line power or battery power, the battery *must* always be in the calculator.

Ready to begin? Slide the ON-OFF switch to ON, and set the print mode switch to ALL.

The Printer

The HP-10 offers a choice of three different answer modes—DISPLAY, PRINT and ALL. You can set the upper right switch to any of these three positions.

To operate in display mode only (thereby saving paper), set the print mode switch to DSP *(display)*.

To obtain printed answers only (with the display off), set the switch to the PRT *(print)* position. Printing speed on your HP-10 is one line per second.

To use both the printer and the display, set the print mode switch to ALL. Throughout this book, both printed and displayed answers are shown so that you can compare them with your own results.

The paper advance key (🔼) on the upper left of the keyboard advances the paper tape forward, one line at a time.

If you press ▆ ⓢ, the HP-10 prints the value in the display. As you work through this handbook, you will notice that often the printer and the display show different values. That's because the printer notes all the separate entries and operations, while the display keeps a running subtotal.

If you press ▆ ⓣ, the HP-10 prints a line of crosshatches #. You can use this handy feature to separate different calculations on the same paper tape.

Your HP-10 calculator uses special thermal (heat-sensitive) paper, available only from Hewlett-Packard and authorized dealers. Because we want you to explore your calculator fully and work several learning examples, two extra rolls of paper are shipped with your calculator. (Appendix A contains instructions for changing the paper.)

Prefix Functions

Some of the keys perform more than one function. One function is indicated by the symbol on the flat of the key; the second function is indicated by the gold symbol above the key. To select the gold function, first press the gold prefix key ▓, then press the function key.

▓ Ⓢ   To print the number in the display, press ▓Ⓢ.

Ⓢ   To obtain a subtotal, press Ⓢ .

In this handbook, the prefix functions appear in gold, outlined by a box, like so: #̲ C̲M̲

Keying in Numbers

Key in numbers by pressing the digit keys in sequence. The decimal point must be keyed in if it is part of the number (unless you are in automatic decimal mode as described in the next section).

Press	**Display**	**Printer**
1̲ 4̲ 8̲ •̲ 8̲ 4̲	*148.84*	
±̲ ≡̲	*148.84*	148.84 +

Notice that the number is not printed until you press an arithmetic operator, the same way an adding machine or desktop calculator works. One advantage of the HP-10 is that you can read the number in the display and check it before imprinting on the paper tape.

On the tape, the arithmetic operator (+) appears to the right of the number. If you press the wrong operator—say, addition instead of subtraction—a quick check of operations listed on the tape simplifies tracking the error.

Clearing Operations

Suppose you meant to key in 148.74 instead of 148.84. No problem, clearing and correcting mistakes is easy with your HP-10.

CE *Clear entry* key, clears the display.
█ **C** *Clear,* clears the entire calculator.
█ **CM** *Clear memory,* clears the memory.

If you discover the entry error *before* the operator key is pressed, simply clear the display with **CE** and key in the correct number. After an operator key is pressed, the number is loaded into the calculator. You can either subtract out the entry that you added incorrectly and continue on, or press **C** and start over again.

Whenever you total a set of figures, **T** clears the entire unit except the display and the memory. This means your HP-10 is ready to start a new problem immediately; it is not necessary to clear it after totalling.

Press █ **C** now to clear the calculator.

Addition and Subtraction

The HP-10 handles addition and subtraction just like an adding machine. Key in the number, then press **+=** or **–**. The display keeps a running subtotal as you go along. To obtain a printed subtotal, press **S**. For the total, Press **T**.

To Solve	Press	Display	Printer
12 − 3	12 **+=**	12.00	12.00 +
	3 **–**	9.00	3.00 –
	T	9.00	9.00 T
12 + 3 − 5	12 **+=**	12.00	12.00 +
			3.00 +
	3 **+=**	15.00	5.00 –
	5 **–**	10.00	10.00 T
	T	10.00	

Press		Display	Printer
$123.23	123.23 ⊞	123.23	
–456.09	456.09 ⊟	–332.86	
780.00	780 ⊞	447.14	
? Subtotal	Ⓢ	447.14	
+ 58.30	58.30 ⊞	505.44	
? Total	Ⓣ	505.44	

```
123.23 +
456.09 -
780.00 +
447.14 S
 58.30 +
505.44 T
```

Repeat Addition

If you have more than one item at the same price or numerical value, simply press the ⊞ key repeatedly instead of keying in the digits over again. (This feature is common to many adding machines and cash registers.) For example, you buy one item @ $4.98, two items @ $2.95, and three items @ 99¢. What is the total amount of your purchase?

One way of solving this is to use the repeat add feature. (Another method is to combine accumulated multiplication, which we'll cover later in this section.)

Press	Display	Printer
4.98 ⊞	4.98	
2.95 ⊞ ⊞	10.88	
.99 ⊞ ⊞ ⊞	13.85	
Ⓣ	13.85	

```
4.98 +
2.95 +
2.95 +
0.99 +
0.99 +
0.99 +
13.85 T
```

Notice that you press ⊞ the same number of times as the number of items. For three items, repeat add by pressing the ⊞ key three times.

Repeat Subtraction

If you can add repeatedly, then it follows that you can repeat subtract in the same manner, using the ⊟ key.

Suppose, much to your embarrassment, you discover you only have $10 after the above items are totalled ($13.85). You decide to forego one $2.95 item and two 99¢ items. What is the new total?

Press	Display	Printer
13.85 ⊞	13.85	13.85 +
2.95 ⊟	10.90	2.95 -
.99 ⊟⊟	8.92	0.99 -
		0.99 -
⊤	8.92	8.92 T

Multiplication and Division

Multiplication and division are performed in left-to-right order, like so:

$$(\text{first operand}) \; \boxed{\times} \; \text{or} \; \boxed{\div} \; (\text{second operand}) \; \boxed{\genfrac{}{}{0pt}{}{+}{=}}$$

The ⊟ key performs an equals operation, and the HP-10 is ready for a new problem. *It is not necessary to clear the calculator between most problems.*

To Solve	Press	Display	Printer
$\dfrac{12}{\times 3}$	12 ✕	12.	12. ✕
	3 ⊞	36.00	3. =
			36.00
$\dfrac{12}{3}$	12 ÷	12.	12. ÷
	3 ⊞	4.00	3. =
			4.00
25 × 15 × 6	25 ✕	25.	25. ✕
	15 ✕	375.	15. ✕
	6 ⊞	2250.00	6. =
			2250.00

To Solve	Press	Display	Printer
16 ÷ 2 × 5	16 ⊟	16.	16. ÷
	2 ⊠	8.	2. ×
	5 ⊞	40.00	5. =
			40.00
24 ÷ 6 ÷ 4	24 ⊟	24.	24. ÷
	6 ⊟	4.	6. ÷
	4 ⊞	1.00	4. =
			1.00

Multiplying and Dividing Negative Numbers

If you are multiplying or dividing by negative numbers, essentially the operation is the same with two additional steps: the negative operand is followed immediately by a ⊟ keystroke, and you should press ⊤ or ©️ first to clear the accumulator.

To Solve	Press	Display	Printer
	■ ©️	0.00	0.00 C
64.7 × −42.5	64.7 ⊠	64.7	64.7 ×
	42.5 ⊟	−2749.75	42.5 -=
			-2749.75
	■ ©️	0.00	0.00 C
24.36 ⌐−1565.73	1565.73 ⊟⊟	−1565.73	1565.73 -
	24.36 ⊞	−64.27	-1565.73 ÷
			24.36 =
			-64.27
	■ ©️	0.00	0.00 C
−1.255 ⌐−47.8772	47.8772 ⊟⊟	−47.88	47.88 -
	1.255 ⊟	38.15	-47.88 ÷
			1.255 -=
			38.15

Automatic Constant

If you wish to multiply or divide several numbers by a constant, take advantage of the HP-10's automatic constant feature.

Perform the first multiplication or division calculation as you just learned. The *second* operand becomes the stored constant. After the first expression, key in the new number, then press ■ ✕ or ■ ÷ for successive calculations.

To Solve	Press	Display	Printer
150 × .85	150 ✕	150.	150. ×
	.85 ±	127.50	0.85 =
			127.50
30 × .85	30 ■✕	25.50	30. ×K
72 ×.85	72 ■✕	61.20	25.50
			72. ×K
			61.20

A total may be used as a constant, in just the same manner.

Example: A company spends $250,000 a year on TV advertising, $87,500 a year on magazine ads, and $25,000 a year on newspaper advertising. What portion of the ad budget does each medium represent?

Press	Display		Printer
■ ⓒ	0.00		0.00 C
250000 ±	250000.00		250000.00 +
			87500.00 +
87500 ±	337500.00		25000.00 +
25000 ±	362500.00		362500.00 T
Ⓣ	362500.00		250000. ÷K
250000 ■÷	0.69	TV	0.69
87500 ■÷	0.24	Magazines.	87500. ÷K
25000 ■÷	0.07	Newspapers.	0.24
			25000. ÷K
			0.07

Accumulated Multiplication

In many applications, it is desirable to multiply quantities, then add the products to obtain a total. The HP-10 simplifies this calculation because the ± key also adds numbers to an accumulator.

Calculate each multiplication expression separately and press ⊟ twice. The first time you press the ⊟ key, it calculates the answer. The second time you press it, the answer is added to the accumulator. For a final total, press ⊤.

To Solve	Press	Display	Printer
	■ ⓒ	0.00	0.00 C
147 × 58 = ?	147 ✖	147.	147. ×
			58. =
258 × 63 = ?	58 ⊟ ⊟	8526.00	8526.00
			8526.00 +
?	258 ✖	258.	258. ×
			63. =
	63 ⊟ ⊟	24780.00	16254.00
			16254.00 +
	⊤	24780.00	24780.00 T
2.53 × 69.4 × 10 = ?	2.53 ✖	2.53	2.53 ×
3.76 × 20 × 86 = ?	69.4 ✖	175.582	69.4 ×
			10. =
?	10 ⊟ ⊟	1755.82	1755.82
			1755.82 +
	3.76 ✖	3.76	3.76 ×
	20 ✖	75.2	20. ×
			86. =
	86 ⊟ ⊟	8223.02	6467.20
			6467.20 +
	⊤	8223.02	8223.02 T

You could also use accumulated multiplication for the problem that you solved earlier by repeat addition. (If there are three items or less, the repeat addition method is quicker because it requires fewer keystrokes. If there are four or more items, use accumulated multiplication.)

$$1 \text{ item } @ \ \$4.98 \ = \ ?$$
$$2 \text{ items } @ \ \$2.95 \ = \ ?$$
$$3 \text{ items } @ \ \ .99¢ \ = \ \underline{?}$$
$$?$$

Press	Display	Printer
4.98 [±]	*4.98*	*4.98 +*
2.95 [×] 2 [±]	*5.90*	*2.95 ×*
		2. =
[±]	*10.88*	*5.90*
		5.90 +
.99 [×] 3 [±]	*2.97*	*0.99 ×*
		3. =
[±]	*13.85*	*2.97*
[T]	*13.85*	*2.97 +*
		13.85 T

Chain Calculations

Chain calculations essentially combine two or more of the four arithmetic operations that you have learned thus far. You work a problem the same as if you were doing it with pencil and paper. For example, to solve $(6 - 2) \times 3 \div 5$, you would first calculate the $(6 - 2)$:

$$\overset{4}{(\cancel{6} - 2)} \times 3 \div 5$$

Then you work through the problem, one number and operation at a time:

$$\overset{12}{\cancel{4} \times 3} \div 5 = 2.40$$

The key to your HP-10 is that it handles one operation at a time much the way you would write the problem. To solve the same problem on your HP-10:

To Solve	Display	Printer
▇ [C]	*0.00*	*0.00 C*
		6.00 +
6 [±] 2 [−]	*4.00*	*2.00 −*
		4.00 ×
[×] 3 [÷] 5 [±]	*2.40*	*3. ÷*
		5. =
		2.40

Notice that the problem involved a parenthetical expression followed by multiplication and division, so you could solve the problem in left-to-right order. If the expression were followed by addition and subtraction, then you would need to use either the accumulator or the memory. For example, to solve:

$$\left(\frac{9}{2}\right) + 14.2 - 7.75 = ?$$

You would first perform the division, then the addition and subtraction.

$$\overset{4.5}{\cancel{\left(\frac{9}{2}\right)}} + 14.2 - 7.75 = 10.95$$

You can either add the division answer to the accumulator by pressing $\boxed{\pm}$ and continuing on; or put it in the memory by pressing $\blacksquare{M+}$, then add and subtract the other values in the memory. Both solutions are shown here; use whichever method is most comfortable for you.

Using the accumulator:

Press	Display		Printer
■ C	0.00		0.00 C
9 ÷ 2 ⊞	4.50		9. ÷
			2. =
⊞	4.50	Put in accumulator.	4.50
			4.50 +
14.2 ⊞	18.70		14.20 +
7.75 ⊟	10.95		7.75 −
T	10.95		10.95 T

Using the memory:

Press	**Display**		**Printer**

■ CM

9 ⊟ 2 ⊞	4.50	
M+	4.50	Put in memory.
14.2 M+	14.20	Added to memory.
7.75 M−	7.75	Subtracted
		from memory.
MR	10.95	Answer.

Printer display:
```
            CM
       9. ÷
       2. =
     4.50
     4.50 M+
    14.20 M+
     7.75 M−
    10.95 MR
```

The accumulator and the memory are explained in detail in the next section of this handbook. Meanwhile, there are three rules to remember when solving chain calculations:

1. Following the rules of mathematics, you *must* solve the expression in parentheses first.

2. If the parenthetical expression is followed by multiplication or division, continue on through the problem.

3. If the parenthetical expression is followed by addition or subtraction, sum the values in either the accumulator or the memory. Be sure to clear the accumulator (C or T) or the memory (CM) first.

Sample Problems

Ready to try some calculations on your own? The answers are given here. If you have trouble obtaining the correct answers, review this section. In some instances, you can solve a problem in more than one way. Use whatever method is most comfortable for you.

$$\begin{array}{r} \$\ 37.50 \\ -\ 42.86 \\ 98.33 \\ \hline \end{array}$$

$$=\textit{92.97}$$

$$\$9.95 \times 4 = \textit{39.80}$$

$$(2 \times 3) + (4 \times 5\ ) = \textit{26.00}$$

$$\frac{12\ -\ 3}{-3}\ = \textit{-3.00}$$

$$18 \div 4 \times 2.8\ = \textit{12.60}$$

$$\begin{array}{r} \$\ 47,000.00 \\ -\ \ \ 3,000.00 \\ -\ \ \ \ \ 775.50 \\ -\ \ \ \ \ 775.50 \\ \hline \end{array}$$

$$=\textit{42449.00}$$

$$\begin{array}{rl} 52 \times 3.69\ = & ? \\ 57 \times 16.14\ = & ? \\ 82 \times 7.88\ = & ? \\ \hline \end{array}$$

$$\textit{1758.02}$$

$$\begin{array}{r} \$\ 165.93 \\ 78.42 \\ 17.67 \\ \hline \end{array}$$

$$=\textit{262.02}$$

If three tanks contain 20, 14.4 and 55 gallons respectively, what is the capacity of each tank in liters? (1 U.S. gallon $=$ 3.785 liters)

75.70	liters
54.50	liters
208.18	liters

The Display, Accumulator, and Memory

The Display

Your HP-10 displays and prints numbers up to 10 digits, as well as a decimal point and a minus sign (if necessary). Whenever you turn on your HP-10, it "wakes up" displaying and rounding numbers to two decimal places. However, there are other display/printer formats. Let's take a look at them.

Display/Printer Formatting

For most financial calculations involving dollars and cents two digits beyond the decimal point are usually sufficient. For those occasions when more or less than two decimal digits are required, the calculator display format may be changed by pressing ▉ and a number from 0 through 8 specifying the desired number of decimal digits.

Press	Display
19.785234	19.785234
▉ 8	19.78523400
▉ 2	19.79
▉ 4	19.7900

Notice that numbers that are longer than the display format setting are truncated (cut off) and the extra digits are lost.

Floating point display mode may be set by pressing ▉ 9. In floating point mode all answers and entered numbers are maintained to the calculator's full 10-digit accuracy. Trailing zeros are truncated.

The printer formats numbers the same way. To view this:

Press	Printer
■ 2	0.00 C
■ ©️	19.78523400 +
■ 8	19.7852 +
19.785234 ⊞	19.79 +
■ 4 ⊞	20. +
■ 2 ⊞	
■ ⬜0⬜ ⊞	

Rounding Numbers

One important point to remember about formatting numbers is that when you round *down,* you cannot recover the same degree of accuracy. The successive decimal places will be filled with zeros.

To view this, set the mode switch to ALL and try the following exercise:

Press	Display	Printer
■ ©️	0.	0. C
■ 3	0.000	1.555 +
1.555 ⊞	1.555	1.56 S
■ 2 Ⓢ	1.56	1.560 S
■ 3 Ⓢ	1.560	1.6 S
■ 1 Ⓢ	1.6	1.600 S
■ 3 Ⓢ	1.600	

Automatic Decimal Mode

If you're keying in several monetary figures—dollars and cents—then the automatic decimal mode will save time. This format automatically places the decimal point two places from the right.

To select automatic decimal mode, press ■ ⊙.

Example: Add the following column of figures using the automatic decimal mode. (It is not necessary for you to key in the decimal point.)

$$\begin{array}{r} \$ \ 193.24 \\ - \ \ \ 56.83 \\ 146.77 \\ \underline{92.22} \\ ? \end{array}$$

Press	Display	Printer
■ Ⓒ	0.000	0.000 C
■ ⊙	0.00	193.24 +
19324 ±	193.24	56.83 –
5683 ⊟	136.41	146.77 +
14677 ±	283.18	92.22 +
9222 ±	375.40	375.40 T
Ⓣ	375.40	

If you key in a decimal in another position, the decimal from the keyboard overwrites the automatic decimal.

Press	Display	Printer
1234 ±	12.34	12.34 +
1.234 ±	13.57	1.23 +

Press	**Display**	**Printer**
5678 [±]	70.35	56.78 +
[T]	70.35	70.35 T

You can also multiply or divide but the automatic decimal only acts on entries, not on answers. For example, to calculate the price of six items @ $1.95, key in [6][•], not just 6.

Press	**Display**	**Printer**
195 [×]	1.95	1.95 ×
6.	6.	6. =
[±]	11.70	11.70

If you had keyed in just the number 6, there would be a different answer:

| 0.12 |

Sometimes, automatic decimal mode is refered to as ''dollar'' mode because in this format the calculator reads numbers as dollars and cents. Basically, it is the same format as ■ 2 except that the HP-10 automatically enters the decimal point. Press ■ 2 now to return to normal two-decimal display.

Error Display

If you attempt an impossible operation, the word | Error | appears in the display. For example, key in a number and divide by zero. (Go ahead, try it.) That is an illegal operation.

To clear the error display, press [CE] *(clear entry)* or any key.

Your HP-10 can hold and remember up to 6 keystrokes ahead of the printer. If you key in numbers so fast that you get more than 6 keystrokes ahead of the printing mechanism, your HP-10 will display | Error |. If you slow down a little, the problem is alleviated.

Low Power Display

When the batteries get low, several decimal points will appear in the display. This means you have approximately one minute of operating time left. Then you must either charge the battery or insert a fully-charged battery pack. (Refer to appendix A.)

If you switch to ac line power, turn your HP-10 OFF, then ON again, to remove the decimal points from the display.

Print Display Entry

By now, you must have noticed that the display and printer may not show the same number simultaneously. The display keeps a running subtotal, while the printer annotates separate entries and operations.

If you wish to print the number in the display, press ▉ S. The number is recorded, that's all—it is not added into the sum, nor does it affect any of your calculations. A printed display entry is identified on the tape by #.

Pressing ▉ T separates calculations with a line of crosshatches.

Press	**Display**	**Printer**
▉T	0.00	#############
▉c	0.00	0.00 C
3021976	3021976.	3021976. #
▉S	3021976.	12.00 +
12 [±]	12.00	3.00 +
3[±]	15.00	15.00 T
T	15.00	

The Accumulator

When you performed accumulated multiplication in section 1, you used the accumulator to store intermediate answers. Basically, the accumulator is a memory that holds numbers while you perform other calculations. You can add numbers to the accumulator or subtract numbers out, but you cannot multiply or divide.

What goes into the accumulator?

1.   Any addition operand (number) followed by ⊞ .
2.   Any subtraction operand (number) followed by ⊟ .
3.   Any multiplication or division *answer* followed by ⊞ . That really means two presses of the ⊞ key:

$$12 \; \boxed{\times} \; 3 \; \boxed{\pm} \; 36 \; \boxed{\pm}$$

Calculates ⟋   ⟍ Adds answer to
answer.   accumulator.

$$12 \; \boxed{\div} \; 3 \; \boxed{\pm} \; 4 \; \boxed{\pm}$$

Calculates ⟋   ⟍ Adds answer to
answer.   accumulator.

With multiplication and division, the first ⊞ functions as an "equals" operation. The second ⊞ adds the answer to the accumulator (or subtracts it if you press ⊟). Press Ⓢ to subtotal the numbers and leave the accumulator as it stands. Press Ⓣ to obtain a total. The Ⓣ function clears the accumulator and sets it to zero, ready to start a new problem.

Example: It's inventory time for the Ex-Pensive Jewelry Shop. Calculate the extensions for the following items, then add them in the accumulator to obtain the total value of the stock in inventory.
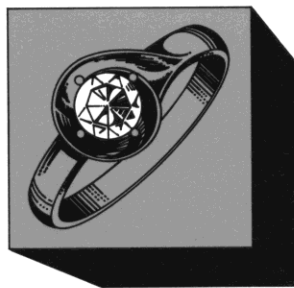
Quantity	Cost	Unit Description	Price	Extension
250	each	Silver bracelet	$ 11.98	?
120	each	Gold chain	8.98	?
46	each	Pearl ring	7.98	?
27	each	Jade ring	11.98	?
19	dozen	Pierced earrings	29.88	?
1	each	Diamond ring	199.98	?
			Total:	

Press	Display	Printer
▇ ⓒ	0.00	0.00 C
250 ✕ 11.98 ±	2995.00	250. ✕
		11.98 =
		2995.00
±	2995.00	2995.00 +
120 ✕ 8.98 ±	1077.60	120. ✕
		8.98 =
		1077.60
±	4072.60	1077.60 +
46 ✕ 7.98 ±	367.08	46. ✕
		7.98 =
		367.08
±	4439.68	367.08 +
27 ✕ 11.98 ±	323.46	27. ✕
		11.98 =
		323.46
±	4763.14	323.46 +
19 ✕ 29.88 ±	567.72	19. ✕
		29.88 =
		567.72
±	5330.86	567.72 +
199.98 ±	5530.84	199.98 +
Ⓣ	5530.84	5530.84 T

In many situations, you can use either the accumulator or the memory to add and subtract answers, so let's take a look at the memory.

The Memory

Like the accumulator, the memory is a "holding" bin or storage place for numbers. You can put numbers in **M+** or subtract numbers out **M-** , but you cannot multiply or divide in the memory itself. If you want to multiply or divide, recall the number from memory by pressing **MR** then perform the operation from the keyboard.
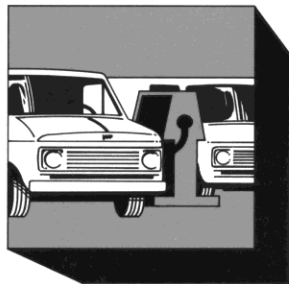
The memory is like the accumulator in that it adds the numbers. To obtain a total of the numbers in memory, press **MR**. It copies the answer into the display, but the total is still stored in memory if you need it again. Unlike **T**, the **MR** key does not clear anything—it merely displays what is in the memory.

To clear the memory, press ■**CM** *(Clear memory)*. If you press ■**C** *(Clear),* everything in the calculator, including the memory, is cleared.

In some instances, you can use either the accumulator or the memory to solve a problem, e.g., accumulated multiplication problems. The only difference is the use of different keystrokes, so it's just a matter of personal preference.

However, if you want to store an intermediate answer for later use in *multiplication* or *division,* use the memory. Although you cannot multiply or divide in the memory itself, you can preserve a number in the memory, then recall it to perform such operations from the keyboard.

Example: The XYZ Printing Company has two delivery vans, each of which is driven approximately 1200 miles a month. If the vans average 16 miles per gallon, how much would the company save each year by purchasing gasoline for 56.9¢ a gallon rather than 62.9¢ a gallon?

Press	**Display**		**Printer**

Press	Display		Printer
▪ C	*0.00*		0.00 C
1200 ▪ 12 ▪ 2 ±	*28800.00*	Total miles.	1200. x
			12. x
			2. =
			28800.00
÷ 16 ± M+	*1800.00*	Gallons/year.	28800.00 ÷
			16. =
			1800.00
			1800.00 M+
.629 ± .569 – T	*.06*	Savings on each gallon.	0.63 +
			0.57 –
			0.06 S
▪ MR ±	*108.00*	$ savings each year.	0.06 x
			1800. MR
			1800. =
			108.00

Using the memory saves keystrokes—and fewer keystrokes mean fewer errors. If you use a certain number several times in a calculation, recalling it from memory eliminates entering the number repeatedly from the keyboard. An example of this is the declining-balance depreciation problem in section 4.

There are other applications, too, when only the memory will serve your purpose. For example, if you are computing commissions, you cannot use the accumulator, only the memory.

Example: Sue Bates is an astute realtor and a good salesperson. Last month she sold three houses for:

Price	Commission
$87,500	6%
$64,000	3%
$79,500	3%

How much did Sue earn last month?

Press	Display	Printer
▇Ⓒ	*0.00*	
87500 ✖ 6 ▇	*5250.00*	

```
   0.00 C
87500. ×
    6. %=
5250.00
```

Now, what happens if you try to use the accumulator?

Press	Display	Printer
▣	*92750.00*	

```
92750.00 +%
```

As you will learn in the next section, the calculator computes that as a net amount problem and adds the percentage to the base amount! So, let's start over again, using the memory this time.

Press	Display	Printer
▇Ⓒ	*0.00*	
87500 ✖ 6 ▇	*5250.00*	
M+	*5250.00*	
64000 ✖ 3 ▇	*1920.00*	
M+	*1920.00*	
79500 ✖ 3 ▇	*2385.00*	
M+	*2385.00*	
MR	*9555.*	

```
   0.00 C
87500. ×
    6. %=
5250.00
5250.00 M+
64000. ×
    3. %=
1920.00
1920.00 M+
79500. ×
    3. %=
2385.00
2385.00 M+
   9555. MR
```

Using the Memory to Verify Answers

The memory is particularly helpful if you want to verify ratio or proration calculations. As you compute each ratio, store it in the memory; after you have completed the calculations, press MR to see if they all add up properly.

Example: Given the following sales for the month, what proportion did each sales clerk contribute? (The easiest way to solve this is to use the total as an automaitc constant and divide.)

Sales Clerk	Monthly Sales
A	$17,600
B	$19,100
C	$16,700

Press	Display		Printer
▪ⓒ	0.00		0.00 C
17600 ±	17600.00		17600.00 +
19100 ±	36700.00		19100.00 +
16700 ±	53400.00		16700.00 +
Ⓣ	53400.00		53400.00 T
			17600. ÷K
			0.33
17600 ▪ ÷ M+	0.33	A	0.33 M+
19100 ▪ ÷ M+	0.36	B	19100. ÷K
16700 ▪ ÷ M+	0.31	C	0.36
			0.36 M+
			16700. ÷K
			0.31
			0.31 M+

All the ratios should add up to 1. Do they?

Press	Display	Printer
MR	1.00	1. MR

Example: Your company is divided into three departments. If your heating bill for the month is $488.75 and the bill is prorated according to space allocation, how much will you charge to each department?

Department	Floor Space	Heating Cost
Marketing	932 sq. feet	?
Manufacturing	6151 sq. feet	?
Engineering	2399 sq. feet	?

Press	Display		Printer
▪ⓒ	0.00		0.00 C
932 [±]	932.00		932.00 +
6151 [±]	7083.00		6151.00 +
2399 [±]	9482.00		2399.00 +
[T]	9482.00	Total sq. feet.	9482.00 T
▪ 6			488.75 ÷K
488.75 ▪ ÷ [±]	0.051545	Heating cost per sq. foot (to six places).	0.051545
			0.051545 +
▪ 2	0.05		932. ×K
932 ▪ [×][M+]	48.04	Heating cost for Marketing.	48.04
			48.04 M+
			6151. ×K
6151 ▪ [×][M+]	317.05	Heating cost for Manufacturing.	317.05
			317.05 M+
			2399. ×K
2399 ▪ [×][M+]	123.66	Heating cost for Engineering.	123.66
			123.66 M+
[MR]	488.75	Charges add up to total heating bill.	488.75 MR

Notice that the heating cost per square foot is carried out to six decimal places, for greater accuracy. Since this number becomes the automatic constant, it is stored internally to six places even though you return the display/printer format to two decimal places.

Using Both the Accumulator and the Memory

Do you need two memories? If so, use both the accumulator and the memory. One of the most common applications of this type is double-entry bookkeeping.

Example: Given the balance sheet for May 31, 1977, and a list of transactions for the month of June, calculate a balance sheet for June 30, 1977.

Burglar-Proof Lock Company
Balance Sheet
May 31, 1977

Assets		Liabilities	
Cash	$4,500.00	Super Steel Co.	$ 600.00
Furniture	900.00	Central Furniture	150.00
R. Jones Inc.	250.00	Total Liabilities	$ 750.00
		Proprietorship	
		Capital	$4,900.00
Total Assets	$5,650.00		$5,650.00

June transactions:

1. Paid Super Steel Co. $400 on the $600 debt.
2. Bought a $200 desk on credit from Central Furniture.
3. Sold $1,000 worth of locks to R. Jones on credit.
4. Paid Central Furniture $100 on debt.

Calculate the value of the assets in the memory, and the value of the liabilities and proprietorship in the accumulator, taking the transactions one at a time. Both **MR** and ⊤ should be equal.

Press	Display		Printer
■ⓒ	*0.00*		*0.00 C*
5650 **M+**	*5650.00*	May 31 assets put in memory.	*5650.00 M+*
			5650.00 +
±	*5650.00*	May 31 liabilities put in accumulator.	*400.00 M-*
			400.00 -
400 **M-**	*400.00*	Cash decreases.	*200.00 M+*
−	*5250.00*	Super Steel debt reduced.	*200.00 +*
200 **M+**	*200.00*	Desk acquired.	*1000.00 M+*
			1000.00 +
±	*5450.00*	Liabilities (Central debt) increase.	*100.00 M-*
			100.00 -
1000 **M+**	*1000.00*	Sale to Jones reduces inventory.	*6350.00 T*
±	*6450.00*	Company capital increases.	*6350. MR*
100 **M-**	*100.00*	Cash to Central Furniture.	
−	*6350.00*	Reduces Central debt (liability).	
T	*6350.00*	Total liabilities.	
MR	*6350.*	Total assets.	

Rounding and Arithmetic Calculations

Before leaving this section, it is important to review rounding numbers.

Selection of a rounding mode (such as ■ 2) means that numbers entered in addition and subtraction problems will be rounded to the number of decimal places selected (in this case, two). The results of the addition and subtraction operations are rounded to the specified number of places, and this rule also applies to memory addition and subtraction.

With multiplication, division and percent problems, the number is *not* rounded on input but rather, is used with the decimal place accuracy specified, and the result is rounded to the specified number of places. In special cases, you can override the rounding mode to provide desired accuracy of the output. For example, large quantities of low cost parts are often priced with three-place decimal accuracy, but always billed in two-place accuracy.

$$\blacksquare\ 3$$
$$1255 \text{ (units)} \times \$.037 \text{ (price)} = \$46.435$$
$$\blacksquare\ 2 = \$46.44$$

If the price input (.037) were rounded to 0.04, the result would be $50.20, not $46.44.

Percentage Calculations

You can solve a whole range of percentage problems quickly and easily using the
% key. With your HP-10, you don't have to convert percents to their decimal equiv-
alents; i.e., 4% need not be changed to .04. Key it in the way that you see and say it,
4 **%**.

Calculating Percents

To find the percent of a number, press:

(base number) **x** (percentage number) **%**

The function is performed immediately. It is not necessary to clear the HP-10 between
simple percent calculations.

To Solve	Press	Display	Printer
14% of 675	675 **x**	675.	675. x
	14 **%**	94.50	14. %=
			94.50
40% of 335	335 **x**	335.	335. x
	40 **%**	134.00	40. %=
			134.00

Percent Constant

If you are calculating several different percentages of the same number, take advantage
of the automatic constant feature to store your base number. The percent constant feature
only works with multiplication, not division.

Example 1: You are debating whether to put a 15%, 20%, or 25% down payment on a $47,000 house. What is the amount of each down payment?

Press	Display	Printer
47000 ☒ 15 ☒	*7050.00*	
20 ☒	*9400.00*	
25 ☒	*11750.00*	

```
    47000.  ×
       15.  %=
  7050.00
       20.  %=
  9400.00
       25.  %=
 11750.00
```

Example 2: You have $7000 to invest and are debating between two stocks—one is very safe and secure and produces an 8.2% rate of return. The other stock is rather speculative but could provide a 12.3% annual yield. How much would you earn (annually) on each investment? How would that compare to a savings account at 6% or savings bonds at 7½%?

Press	Display	Printer
▨ⓒ	*0.00*	
7000 ☒ 8.2 ☒	*574.00*	
12.3 ☒	*861.00*	
6 ☒	*420.00*	
7.5 ☒	*525.00*	

```
   0.00 C
  7000.  ×
     8.2 %=
  574.00
    12.3 %=
  861.00
       6.  %=
  420.00
     7.5 %=
  525.00
```

Finding Net Amount

If you buy a major item, often you must add the sales tax amount—or subtract a discount amount—to find the total cost of the item. Calculating this net amount is easy with your HP-10 because the calculator retains the base amount before you add or subtract percentages. The procedure is:

(base amount) ☒ (percent number) ☒

⊞ or ⊟

Example: If the sales tax on a $489 color TV set is
6%, what is the amount of the sales tax and the total
cost of the television set?
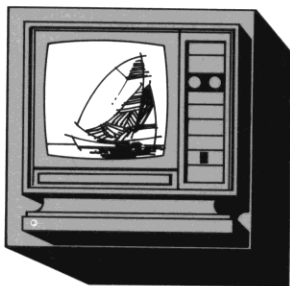
Press	Display	Printer
489 ☒ 6 ▦	29.34	489. ✗
		6. %=
⊞	518.34	29.34
		518.34 +%

How fortunate, the TV set is on sale at 15% off. What will be the cost (including sales
tax)?

Press	Display	Printer
489 ☒ 15 ▦	73.35	489. ✗
		15. %=
⊟	415.65	73.35
☒ 6 ▦	24.94	415.65 -%
		415.65 ✗
		6. %=
⊞	440.59	24.94
		440.59 +%

Finding Proportions

To find what percent one number is of another (proportion), state the problem as
"A is what percent of B?"

$$\frac{A}{B} = ?\%$$

The keystroke procedure is:

A ⊟ B ▦

For example, 64 is what percent of 340?

Press	Display		Printer
64 ⊟	*64.*		
340 %	*18.82*	Percent.	

```
64. ÷
340. =%
18.82
```

Example: For $300 down, you can purchase a $1300 quadraphonic stereo system. What percentage of the price does your down payment represent?

Press	Display		Printer
300 ⊟	*300.*		
1300 %	*23.08*	Percent.	

```
300. ÷
1300. =%
23.08
```

Percent Difference

Percent difference ($\Delta\%$) is a comparison or ratio of two numbers that often signifies that a change has taken place. ''Cost of living has risen 9.6% this past year'' may be cause for concern, while ''a 12% raise effective today'' may be cause for celebration.

Percent difference is the ratio of increase or decrease. To calculate this, key in the amount that occurred *last* in time (i.e., the most recent value). Subtract the amount that occurred *first* in time, then divide by the number that occurred first in time, and press % .

$$\frac{L - F}{F} = \Delta\%$$

A positive answer denotes an increase, while a negative answer denotes a decrease.

Let's take an example. Your rent jumps from $285 a month to $335 a month. What percent is the increase?

Press	Display		Printer
■ⓒ	*0.00*		0.00 C
335 [±]	*335.00*		335.00 +
285 [−]	*50.00*		285.00 −
[÷] 285 [%]	*17.54*	Percent.	50.00 ÷
			285. =%
			17.54

Example: Last year you purchased stock for $50 a share, and now it's quoted at $37.50 a share. What percent is the decrease?

Press	Display		Printer
■ⓒ	*0.00*		0.00 C
37.50 [±]	*37.50*		37.50 +
50 [−]	*−12.50*		50.00 −
■ 50 [%]	*−25.00*	Percent.	−12.50 ÷
			50. =%
			−25.00

If you want to avoid re-entering the number that occurred first in time, you can use the memory.

Percent of Total (Proration)

This calculation involves use of the memory. The keystroke procedure is as follows:

1. Add all the numbers in memory by pressing **M+**.
2. Key in the specific number to be converted to a percentage, and press **[÷]**.
3. Recall the total by pressing **MR**.
4. Press **%**.

Example 1: You own $450 worth of Cunning Calculator stock, $1404 of Flickering Films, and $1500 of Raucous Records. What percent of your portfolio does each represent?
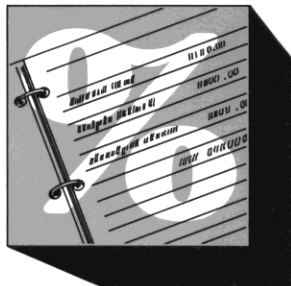
Press	Display		Printer
■ C	0.00		0.00 C
450 M+	450.00		450.00 M+
1404 M+	1404.00		1404.00 M+
1500 M+	1500.00		1500.00 M+
450 ÷ MR %	13.42	% CC.	450. ÷
1404 ■ MR %	41.86	% FF.	3354. MR
1500 ■ MR %	44.72	% RR.	3354. =%
			13.42
			1404. ÷
			3354. MR
			3354. =%
			41.86
			1500. ÷
			3354. MR
			3354. =%
			44.72

Example 2: You earn $950 a month and budget it as follows:

Taxes	$188.76
Rent	$225.00
Utilities	$ 35.00
Food	$160.00
Clothing	$100.00
Entertainment	$ 40.00

Medical/Insurance	$ 35.00
Savings	$100.00
Misc.	$ 66.24
	$950.00

What percent of your budget is allocated for each category?

Press	Display		Printer
▨ C	*0.00*		*0.00 C*
950 M+	*950.00*		*950.00 M+*
188.76 ÷ MR %	*19.87*	% Taxes.	*188.76 ÷*
225 ÷ MR %	*23.68*	% Rent.	*950. MR*
160 ÷ MR %	*16.84*	% Food.	*950. =%*
100 ÷ MR %	*10.53*	% Clothing.	*19.87*
35 ÷ MR %	*3.68*	% Utilities.	*225. ÷*
40 ÷ MR %	*4.21*	% Entertainment.	*950. MR*
35 ÷ MR %	*3.68*	% Med./Ins.	*950. =%*
100 ÷ MR %	*10.53*	% Savings.	*23.68*
66.24 ÷ MR %	*6.97*	% Miscellaneous.	*160. ÷*

950. MR
950. =%
16.84
100. ÷
950. MR
950. =%
10.53
35. ÷
950. MR
950. =%
3.68
40. ÷
950. MR
950. =%
4.21

Printer

```
   35. ÷
  950. MR
  950. =%
   3.68
  100. ÷
  950. MR
  950. =%
  10.53
  66.24 ÷
  950. MR
  950. =%
   6.97
```

Just like numerical values, percents can be used in accumulated multiplication and chain calculations. For example, you are estimating the cost of building a gate for your neighbor and wish to add a 10% buffer in case it takes longer or costs more than you expected.

Materials	$11.97
Labor (2 hrs. @ $5)	10.00
	?
+ 10%	?
	?

This could also be written as a chain calculation:

$$(11.97 + 10) + 10\% \ (11.97 + 10) = ?$$

Press	**Display**	**Printer**
■ C	0.00	
11.97 ±	11.97	

```
   0.00 C
  11.97 +
  10.00 +
  21.97 ◇
```

Press	Display		Printer
10 [±] [S]	21.97		21.97 ×
[×] 10 [%]	2.20		10. %=
[±]	24.17	$	2.20
			24.17 +%

Sample Problems

Now that you've mastered percent calculations, here are some sample problems to test your expertise. If you have trouble obtaining the correct answers, review this section and try again.

Convert the following fractions to percents:

$$3/8 = \boxed{37.50}$$
$$11/16 = \boxed{68.75}$$
$$5/12 = \boxed{41.67}$$
$$2/9 = \boxed{22.22}$$

37% of $2368.75 = $\boxed{876.44}$

87% of $212.67 = $\boxed{185.02}$

You sell your house for $69,950 and owe the realtor a 6% commission. How much is the commission? $\boxed{4197.00}$

Last year you paid $1.69 per pound for meat. This year the same cut costs $2.19 per pound. What percent is the increase? $\boxed{29.59}$ %

You decide to purchase a $6200 sportscar. The dealer gives you 10% off, and the sales tax is 4%. What will you pay for the car? $\boxed{5803.20}$

Applications

Averaging (Mean)

To calculate the mean (arithmetic average) of several numbers, add the values then divide by the number of values in the sample.

Example: The following figures are Bob Milkie's gross incomes for the past 5 years.

$15,765.00
16,913.00
18,150.00
19,087.00
21,253.00

what is the average income?

Press	Display	Printer
15765 [±]	15765.00	15765.00 +
16913 [±]	32678.00	16913.00 +
		18150.00 +
18150 [±]	50828.00	19087.00 +
		21253.00 +
19087 [±]	69915.00	91168.00 ÷
		5. =
21253 [±]	91168.00	18233.60
÷ 5 [±]	18233.60	

Simple Interest

To find the amount of accrued simple interest on either a 360-day or 365-day basis, the formula is:

$$\text{Interest} = \text{Principal} \times \text{time} \times \text{rate}$$

Example: Your good friend needs a loan to purchase a Great Dane and asks you to loan him $450 for 60 days. You lend him the money at 7% simple interest, based on a 360-day year. What is the amount of accrued interest he will owe you?

$$I = \$450 \times \frac{60}{360} \times 7\%$$

Press	Display	Printer
■ C	0.00	
450 ×	450.	
60 ÷ 360 ×	75.	
7 %	5.25	

```
18233.60 #
    450. ×
     60. ÷
    360. ×
      7. %=
   5.25
```

What if the interest is figured on a 365-day year?

Press	Display	Printer
450 ×	450.	
60 ÷ 365 ×	73.97260274	
7 %	5.18	

```
    450. ×
     60. ÷
    365. ×
      7. %=
   5.18
```

Retail Finance Charges

Want to check the interest rate on your charge accounts? It's easy to do with the HP-10 because essentially that is simply a net amount problem.

Example: Your retail charge account charges 1½% monthly interest (18% annual percentage rate) on the unpaid balance. If the unpaid balance is $218.39, what is the finance charge? What is the total amount owed?

Press	Display	Printer
■ Ⓒ	0.00	0.00 C
218.39 ✖	218.39	218.39 ×
1.5 %	3.28	1.5 %=
		3.28
⁺⁼	221.67	221.67 +%
⁺⁼	221.67	221.67 +

After a $50 payment, what is the new balance? Calculate the finance charge and billing for next month's statement.

Press	Display	Printer
50 ⊟	171.67	50.00 -
✖ 1.5 %	2.58	171.67 ×
		1.5 %=
⁺⁼	174.25	2.58
		174.25 +%

Payroll Calculations

The first example illustrates figuring commissions. The second example involves calculating overtime pay.

Example 1: Mr. Smith is a salesman and earns a guaranteed monthly salary of $950 plus 7% commission. If he sold $13,759 worth of merchandise last month, what is his gross monthly pay?
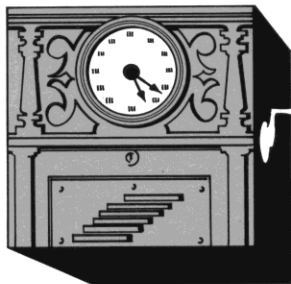
Press	Display	Printer
■ Ⓒ	0.00	0.00 C
13579 ✖ 7 % M+	950.53	13579. ×
950 M+	950.00	7. %=
MR	1900.53	950.53
		950.53 M+
		950.00 M+
		1900.53 MR

Example 2: Mr. Jones earns $375 for a regular 40-hour week. If he works 5½ hours overtime (at time-and-a-half), what is his gross pay for the week?

Press	Display	Printer
▨ⓒ	0.00	0.00 C
375 [±]	375.00	375.00 +
÷ 40 ✕ 1.5	1.5	375.00 ÷
		40. ✕
		1.5 ✕
✕ 5.5 [±]	77.34	5.5 =
		77.34
[±]	452.34	77.34 +
ⓣ	452.34	452.34 T

Markup

The difference between the cost and the retail price of an article is called markup. This is expressed as a percentage, relative to the cost of the article.

$$\text{Markup} = \frac{\text{retail price} - \text{cost}}{\text{cost}} \times 100\%$$

Example: You purchase several typewriters @ $129.50 and sell them @ $187.78. What is your markup?

Press	Display		Printer
▨ⓒ	0.00		0.00 C
187.78 [±] 129.50 ⊟	58.28		187.78 +
			129.50 -
÷ 129.50 ▨	45.00	% markup.	58.28 ÷
			129.50 =⁒
			45.00

Margin

Margin is the difference between the cost and the retail price, only this time it is calculated in relation to the retail price.

$$\text{Margin} = \frac{\text{retail price} - \text{cost}}{\text{retail price}} \times 100\%$$

Taking the typewriters that cost $129.50 and sell for $187.78, you would calculate the margin as follows:

Press	Display		Printer
▣ⓒ	*0.00*		
187.78 ⊡ 129.50 ⊟	*58.28*		
⊟ 187.78 ▣	*31.04*	% margin.	

```
      0.00 C
    187.78 +
    129.50 -
     58.28 ÷
    187.78 =%
     31.04
```

So markup is 45% and the margin is 31%.

Discounts

You decide to order a dozen typewriters @ $129.50 and discover that you will receive a 2% discount if you pay the invoice within 10 days. Use the ▣ function to calculate the discount invoice amount, the same way you solved for net amount.

Press	Display	Printer
▣ⓒ	*0.00*	
129.50 ✕ 12 ✕	*1554.*	
2 ▣	*31.08*	
⊟	*1522.92*	

```
      0.00 C
    129.50 ×
     12. ×
      2. %=
     31.08
   1522.92 -%
```

Discount Series

Because business fluctuates during the year, a manufacturer may decide to grant a trade discount in addition to the one already quoted. If he adds a 10% discount to the usual 25% discount rate, this is *not* the same as 35%. A discount series of 25% and 10% implies that the 25% is taken on the original amount, then 10% is taken on the balance—after the first discount is subtracted. This is called a discount series or chain discount.

With your HP-10, this is quickly calculated as two successive net amount problems.

Example: What is the cost of merchandise listed at $840, less 20% and 8%?

Press	Display		Printer
■ⓒ	0.00		0.00 C
840 ✖ 20 %	168.00		840. ×
			20. %=
⊖	672.00	Less 20%.	168.00
			672.00 -%
✖ 8 %	53.76		672.00 ×
			8. %=
⊖	618.24	Less 8%.	53.76
			618.24 -%

Comparative Pricing

As a wise consumer, you often use comparative pricing to determine the "best buy." One method is to calculate the price per ounce, while another method compares two prices.

Example: A 28-ounce jar of apple juice costs 57¢, and a 64-ounce jar costs $1.09. Calculating the price per ounce, which is the better buy?

Press	Display		Printer
■ⓒ	0.00		0.00 C
■ 4	0.0000		0.57 ÷
			28. =
.57 ÷ 28 [±/=]	0.0204	$/oz.	0.0204

1.09 � ÷ 64 |±| *0.0170* $/oz.

```
             1.09 ÷
              64. =
            0.0170
```

The larger size is more economical.

The second method of analyzing price relationships is to calculate the price per ounce of the smaller quantity, then multiply by the larger volume.

Press	Display		Printer
▢ 2			0.00 C
▢ |c|	0.00		0.57 ÷
.57 ÷ 28	28.		28. ×
			64. =
× 64 |±|	1.30		1.30
|±|	1.30		1.30 +

Now, subtract the actual price of the larger size:

| Press	Display		Printer
1.09 |-|	0.21		1.09 -
|T|	0.21		0.21 T

That is, you save 21 cents by purchasing the larger jar of apple juice.

Straight-Line Depreciation

Machines, buildings, delivery trucks, tools, and other tangible assets all decline in value with the passing of time. To provide for the replacement of obsolete or worn-out equipment, you usually set aside a fixed amount of money each year that is equal to the loss in value of that article during the year. This is known as depreciation.

The straight-line method of depreciation is simply a matter of dividing the total depreciable amount by the number of years in the asset's life, then subtracting that amount each

year from the item's value. The easiest method is to use repeat subtraction. The depreciated value each year is displayed but not printed; if you wish, press ■ Ⓢ to print the displayed values.
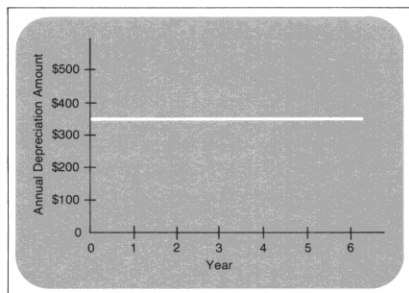
Example: A new popcorn machine costs $2500 and has a salvage value of $400 after 6 years. What is the annual depreciation? What is the machine's value each year?

Press	Display		Printer
■ ②			0.00 C
■ Ⓒ	0.00		2500.00 +
			400.00 −
2500 ⊡ 400 ⊟	2100.00		2100.00 ÷
■ 6 ⊡	350.00	Annual	6. =
		depreciation.	350.00
■ Ⓒ	0.00	Clear accumulator.	0.00 C
			2500.00 +
2500 ⊡	2500.00	Purchase price.	350.00 −
350 ⊟	2150.00	Value after year 1.	350.00 −
⊟	1800.00	Value, year 2.	350.00 −
⊟	1450.00	Value, year 3.	350.00 −
⊟	1100.00	Value, year 4.	350.00 −
⊟	750.00	Value, year 5.	350.00 −
⊟	400.00	Value, year 6.	400.00 T
Ⓣ	400.00	Salvage value.	

Declining-Balance Depreciation

The declining-balance or fixed-rate method of calculating depreciation is a means of accelerated depreciation. A constant percentage is applied each year to the remaining balance (book value) to find the depreciable amount. The asset may not be depreciated below its salvage value.
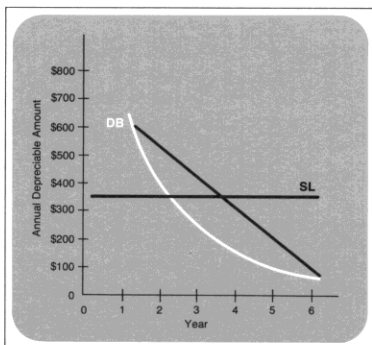
Certain "factors" are authorized for income tax purposes. A factor of 125% simply means 125% declining balance, 200% means double-declining balance. To compute the annual depreciation rate, divide the factor by the asset's estimated life. If you use a factor of 150% for the popcorn machine, then you will depreciate it $\frac{150\%}{6}$ or 25% each year.

Press	Display		Printer
■ C	0.00		0.00 C
2500 ✕ 25 M+ %	625.00	Depreciation year 1.	2500. ✕
			25.00 M+
			25.00 %=
–	1875.00	Book value.	625.00
✕ MR %	468.75	Depreciation₂.	1875.00 –:
			1875.00 ✕
–	1406.25	Book value.	25. MR
✕ MR %	351.56	Depreciation₃.	25. %=
			468.75
–	1054.69	Book value.	1406.25 –:
			1406.25 ✕

| Press	Display		Printer
☒ 🅼🆁 ⅌	263.67	Depreciation₄.	25. MR
⊟	791.02	Book value.	25. %=
☒ 🅼🆁 ⅌	197.76	Depreciation₅.	351.56
⊟	593.26	Book value.	1054.69 -%
			1054.69 ×
± ⁼	593.26		25. MR
			25. %=
400 ⊟	193.26	Subtract	263.67
		salvage value.	791.02 -%
			791.02 ×
Ⓣ	193.26	Depreciation₆.	25. MR
			25. %=
			197.76
			593.26 -%
			593.26 +
			400.00 -
			193.26 T

To calculate double-declining balance depreciation, you would depreciate the popcorn machine by $\frac{200}{6}$ or 33.3% each year.

Amortization Schedule

If a loan or interest-bearing debt is discharged by equal payments, it is said to be amortized. Varying portions of each payment are applied toward principal and interest.

The interest is paid first, then the remainder of the payment is used to reduce the debt. The breakdown of payments into interest portions and principal portions is called an amortization schedule.

Periodic Payment Amount $275.35

Principal Portion of Payment

Interest Portion of Payment

1 2 3 360

Periodic Payment Number
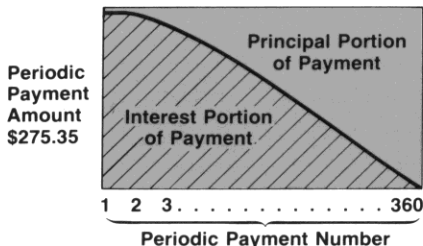
With your HP-10, you can generate an amortization schedule. First, divide the annual interest rate by 12 to calculate the monthly interest rate. Store the payment amount in memory. Then add the interest and subtract the payment each month to find the outstanding balance of the loan at any point in time.

Example: Generate an amortization schedule for a $35,000 mortgage at 8.75% interest with monthly payments of $275.21.

Press	Display		Printer
▮ 3			0.000 C
▮ⓒ	0.000		8.75 ÷
			12. =
8.75 ÷ 12 ⊞	0.729	% monthly	0.729
		interest.	35000. ×
			0.729 %=
▮ 2			255.15
35000 ⊠ .729 ▨	255.15	Interest (first	35255.15 +%
		payment).	35255.15 +
			275.21 M+
⊞⊞	35255.15		275.21 −
275.21 M+⊟	34979.94		34979.94 T
Ⓣ	34979.94	Balance after	34979.94 ×
		first payment.	0.729 %=
			255.00
⊠ .729 ▨	255.00	Interest₂.	35234.94 +%
⊞⊞	35234.94		35234.94 +
MR⊟	34959.73		275.21 MR
			275.21 −
Ⓣ	34959.73	Balance after	34959.73 T
		second payment.	
			34959.73 ×
⊠ .729 ▨	254.86	Interest₃.	0.729 %=
			254.86
⊞⊞	35214.59		35214.59 +%
MR⊟	34939.38		35214.59 +
			275.21 MR
Ⓣ	34939.38	Balance after	275.21 −
		third payment.	34939.38 T

Capital Gains

According to the IRS,* the profit or loss on securities held less than 6 months is subject to 100% taxation (short-term capital gain). If securities are held over 6 months, only 50% of the profit is subject to taxation (long-term capital gain).

Example: If an investor buys and sells stocks as follows, what is the taxable amount?

Stock	Date Bought	Purchase Price	Date Sold	Selling Price
A	1/3	$ 600.00	10/2	$ 825.00
B	1/3	$1215.00	4/6	$ 890.00
C	2/6	$ 960.00	12/8	$1456.00

Stock B is a short-term investment so you would declare 100% of the loss. The other two stocks are long-term investments so only 50% of the profit is taxable. Total each stock's profit or loss, multiply that by 50% where applicable, and add the answers in memory **M+**. Press **MR** for the total taxable amount.

Press	Display		Printer
■ C	0.00		0.00 C
825 ± 600 ⊟ T	225.00	Profit A.	825.00 +
× 50 % M+	112.50	Capital gains A.	600.00 −
890 ± 1215 ⊟ T	−325.00	Loss B.	225.00 T
M+	−325.00	Capital loss B.	225.00 ×
1456 ± 960 ⊟ T	496.00	Profit C.	50. %=
× 50 % M+	248.00	Capital gains C.	112.50
MR	35.5	Taxable amount.	112.50 M+

```
    0.00 C
  825.00 +
  600.00 -
  225.00 T

  225.00 x
    50. %=
  112.50
  112.50 M+
  890.00 +
 1215.00 -
 -325.00 T

 -325.00 M+
 1456.00 +
  960.00 -
  496.00 T

  496.00 x
    50. %=
  248.00
  248.00 M+
   35.5 MR
```

*Be sure to check current IRS regulations concerning capital gains.

Cost Accounting

Having learned how to solve accumulated multiplication and percentages, you can combine the two functions to solve cost accounting problems.

Example: Given the following material, labor and overhead charges, what is the cost of the job?

Materials	$30	Labor variance	8%
Material variance	5%	Labor overhead	250%
Labor	$15		

Mathematically, you would write the problem as:

$$30 + 5\% \quad = \quad ?$$
$$15 + 8\% \quad = \quad ?$$
$$250\% \ (15 + 8\%) \quad = \quad \underline{\quad ? \quad}$$
$$\quad ? \quad \text{Total Cost}$$

Calculate each expression and store it in the accumulator, then press ⊤ for the combined total.

Press	Display	Printer
■ ⓒ	0.00	0.00 C
30	30.	30. ×
✕ 5 %	1.50	5. %=
		1.50
+⁄= +⁄=	31.50	31.50 +%
		31.50 +
15	15	15. ×
✕ 8 %	1.20	8. %=
		1.20
+⁄=	16.20	16.20 +%
		16.20 ×
✕ 250 %	40.50	250. %=
		40.50
+⁄= +⁄=	88.20	56.70 +%
		56.70 +
⊤	88.20	88.20 T

Cost of a Loan

You are borrowing $2500 at 12% annual interest and have a choice of a 2- or 3-year loan. The 2-year loan requires monthly payments of $117.68, while the monthly payments on a 3-year loan are only $83.04. How much would you save by taking the 2-year loan?

Press	Display		Printer
■ⓒ	0.00		0.00 C
			24. ⅹ
24 ⊠ 117.68 ⊞	2824.32		117.68 =
⊟	−2824.32		2824.32
			2824.32 −
36 ⊠ 83.04 ⊞	2989.44		36. ⅹ
			83.04 =
⊞	165.12		2989.44
Ⓣ	165.12	$ saved.	2989.44 +
			165.12 T

Preparing an Income Statement

An income statement is a compilation of figures that tells the owner of a business whether or not he is operating at a profit or a loss during a particular period of time. Basically, an income statement follows two principles:

Sales − cost of articles = gross profit
Gross profit − operating expenses = net profit

Ultimately, it is the net profit that is most important. For example, you purchase a radio for $10 then decide to sell it because you're not happy with it. George sells it for you for $12. That extra $2 is your *gross profit*. But you promised George 50¢ for selling the radio; in essence, this 50¢ is an operating expense. So, you give him his money, which leaves you with an actual or *net profit* of $1.50.

Calculating an income statement involves mostly subtraction and addition. The easiest solution is to store the subtotals in memory.

Example: Prepare an income statement for the Slim-Line Dress Shop for the month of September, based on the following information:

<div>

Slim-Line Dress Shop
Income Statement—September 19XX

Income From Sales

Sales	$ 6,240	
Returns & allowances	500	
Net Sales		?

Cost of Goods Sold

Merchandising Inventory, 9/1	$ 14,650	
Purchases	0	
Total Goods for Sale	$ 14,650	
Less Merchandise Inventory, 9/30	$ 11,200	
Cost of Goods Sold		?

Gross Profit on Sales   ?

Operating Expenses

Salaries	$ 1,620	
Rent	350	
Telephone	30	
Miscellaneous	10	
Total Expenses		?

Net Income   ?

</div>

Press	Display		Printer
■ⓒ	*0.00*		*0.00 C*
6240 ⁺₌ 500 ⊟Ⓣ	*5740.00*	Net sales.	*6240.00 +*
M+	*5740.00*		*500.00 –*
			5740.00 T
14650 ⁺₌ 11200 ⊟Ⓣ	*3450.00*	Cost of goods.	*5740.00 M+*
M–	*3450.00*		*14650.00 +*
MR	*2290.*	Gross profit.	*11200.00 –*
			3450.00 T
1620 ⁺₌ 350 ⁺₌ 30 ⁺₌			*3450.00 M–*
10 ⁺₌ Ⓣ	*2010.00*	Total expenses.	*2290. MR*
			1620.00 +
			350.00 +
			30.00 +
M–	*2010.00*		*10.00 +*
MR	*280.*	Net profit.	*2010.00 T*
			2010.00 M–
			280. MR

Metric/U.S. Conversions

The following chart provides keystrokes for the most common metric/U.S. conversions. If you perform a particular conversion repeatedly, it would be faster to use the automatic constant feature or to store the constant in M+ . Here is the list in alphabetical order:

Centimeters	➗ 2.54* ⁺₌	Inches
Degrees C	✖ 1.8 ⁺₌ 32 ⁺₌ Ⓣ *	Degrees F
Degrees F	⁺₌ 32 ⊟➗ 1.8 ⁺₌ *	Degrees C
Feet	✖ 0.3048* ⁺₌	Meters
Gallons	✖ 3.785 ⁺₌	Liters
Grams	✖ 0.03527 ⁺₌	Ounces
Inches	✖ 2.54* ⁺₌	Centimeters

Kilograms	⊠ 2.205 ±	Pounds
Kilometers	⊟ 1.609 ±	Miles (statute)
Kilometers	⊟ 1.852* ±	Miles (nautical)
Liters	⊟ 3.785 ±	Gallons
Liters	⊠ 1.057 ±	Quarts
Meters	⊟ 0.3048* ±	Feet
Miles	⊠ 1.609 ±	Kilometers
Millimeters	⊟ 25.4* ±	Inches
Ounces	⊠ 0.02957 ±	Liters
Ounces	⊟ 0.03527 ±	Grams
Pints	⊠ 0.4732 ±	Liters
Pounds	⊟ 2.205 ±	Kilograms
Quarts	⊠ 0.9464 ±	Liters
Tons	⊠ 907 ±	Kilograms
Yards	⊠ .9144* ±	Meters

*Exact values.

Maintenance
and Service

Your HP-10 comes complete with the following standard accessories: battery pack, ac adapter/recharger, soft carrying case, three rolls of paper tapes, and the *HP-10 Owner's Handbook*.

Additional rolls of paper tape can be purchased from your local dealer or from Hewlett-Packard.

Charging Times

Your calculator contains a rechargeable battery pack. *The batteries must be in the calculator for it to operate.* With the recharger connected to the calculator and to an ac power outlet, the batteries will charge, whether the calculator is ON or OFF. Normal charging times from dead battery to full charge are:

Calculator ON	17 hours
Calculator OFF	6 hours

Charge the battery before portable use. Shorter charge periods than the above will reduce battery operating time.

Whether the calculator is OFF or ON, the battery pack will never overcharge with the ac adapter/recharger connected to the ac line.

Charging the Battery

CAUTION

Your HP-10 may be damaged if you use any recharger other than the HP ac adapter/recharger supplied with your calculator.

The procedure for charging the battery is as follows:

1. Turn the HP-10 power switch OFF.
2. Insert the recharger plug into the rear connector of the HP-10, and insert the power plug into a live power outlet.
3. At the end of the charging period, you may continue to use your HP-10 with ac power; or disconnect the recharger for battery-only operation.

If the battery pack won't hold a charge, it may be defective. If the one-year warranty is in effect, return the pack to Hewlett-Packard according to the shipping instructions. If your warranty has expired, you should purchase a replacement.

Battery Operation

Use only the HP battery pack. A fully-charged battery pack provides approximately 4 to 7 hours of continuous operation. By turning the power OFF when the calculator is not in use, you can conserve energy and make the HP-10 battery pack last easily through a normal working day.

Another energy-saving hint is to press the decimal point ⊡ between calculations. When you are ready to start a new problem, clear it by pressing **CE** .

Low Power Display

When the batteries get low, several decimal points will appear in the display to warn you of the limited remaining operating time. If you are using the printer, switching to DSP (display only) may provide additional operating time. You must turn the HP-10 OFF then ON again to remove the decimal points in the display. Connecting the ac adapter/recharger or inserting a fully charged spare battery pack will return the calculator to full power operation.

Replacing the Battery

To replace your battery pack, use the following procedure:

1. Turn the HP-10 power switch to OFF, and disconnect the recharger from the calculator.

2. Place your thumb in the semicircular slot on the battery compartment door, and press down. The door will spring open.

3. Remove the battery pack.

4. Drop in a new pack.
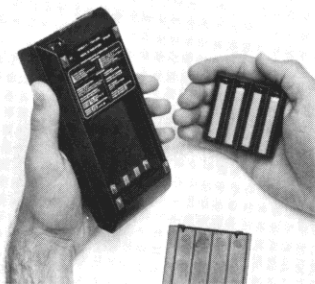
5. Slant the leading edge of the door into the lower edge of the doorway. Place your thumbs on the two pads on the upper edge of the door, and press firmly. The latch will snap into place.

CAUTION

Do not incinerate or mutilate the batteries. They may burst or release toxic materials.

Blank Display

If the display blanks out, turn the calculator OFF, then ON. If 0.00 does not appear in the display, check the following:

1. Make sure the ac recharger is plugged into an ac outlet. If not, turn the calculator OFF before plugging in the recharger.
2. Examine the battery pack to see if the contacts are dirty.
3. Substitute a fully-charged battery pack, if available, for the one that was in the calculator.

If the display is still blank, your calculator should be serviced. (Refer to *Warranty* in this appendix.)

Temperature Range

Temperature ranges for the HP-10 are:

Operating:	0° to 45°C	32° to 113°F
Charging:	15° to 40°C	59° to 104°F
Storage:	–40° to 55°C	–40° to 131°F

Temperature above or below these specified limits may not cause permanent damage to your calculator but will damage the batteries.

Your HP-10 Printer

The printing device in your HP-10 is a thermal printer that uses a moving print head to print upon a special heat-sensitive paper. When the print head is energized, it heats the paper beneath it. The heat causes a chemical change in the paper, which then changes color. The printer in your HP-10 prints answers quickly and quietly, giving you a permanent record of your computations.

Paper for the HP-10

You should use only the Hewlett-Packard thermal paper available in 25-foot rolls (7.62 m) from your nearest HP dealer or by mail from:

Hewlett-Packard
1000 N.E. Circle Boulevard
Corvallis, OR 97330

Because of the special heat-sensitive requirements, standard adding machine paper will *not* work in your HP-10.

Store the paper in a cool, dark place. If stored in a dark place at room temperature with less than 65% humidity, unused or printed paper tape will last for five years.

Discoloration of the paper may occur if it is exposed to direct sunlight for long periods of time, if storage temperatures rise above 50°C (122°F), or if the paper is exposed to excessive humidity or to acetone, ammonia, or other organic compounds. (Exposure to gasoline or oil fumes will not harm your HP-10 paper supply.)

Printed tapes will last 30 days or more without fading under fluorescent light. To ensure the permanence of your records, you should store printed tapes at room temperature in a dark place away from direct sunlight, heat, or fumes from organic compounds. For added permanence or as a backup record, you can copy tapes with a suitable office copier.

Replacing the Paper

To replace the paper roll in your HP-10, proceed as follows:

1. Push the switch next to the paper well to the right. The paper cover will spring open.

2. Remove the empty core from the paper well.

3. Before inserting the new roll of paper, discard the first 2/3 turn to ensure that no glue, tape, or other foreign matter is on the paper. Make sure that the leading edge of the paper is straight, not crooked or jagged. **Do not fold the paper as the double thickness of the edge may obstruct the paper feed.**
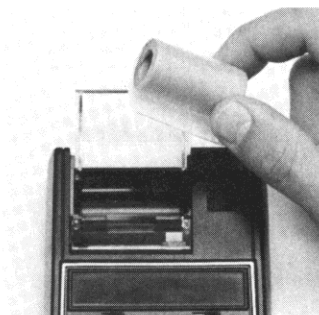
4. Temporarily place the paper roll in the paper roll cover. With your finger, push the leading edge of paper into the slot near the bottom of the paper well. Continue pushing until the paper passes the top edge of the plastic tear bar.

5. Turn the calculator ON, and press the paper advance key several times to assure that the paper is advancing properly.
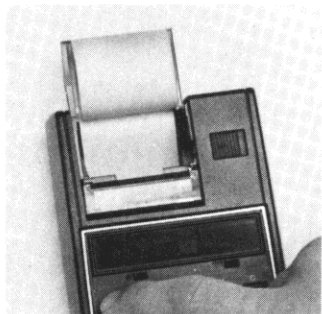
6. Drop the roll of paper into the paper well and close the cover.
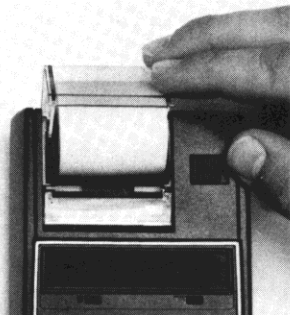
If the paper is feeding properly through the printer mechanism but no printing appears on the tape, the paper roll is probably inserted backwards. The paper is chemically treated and will print on only one side.

Printer Maintenance

All moving parts in the printer mechanism contain a self-lubricating compound, so no lubrication, cleaning or servicing of the mechanism is required. If you may wish to clean the plastic tear bar, use mild soap and water. *Do not use acetone or alcohol to clean the tear bar*. You should *never* attempt to insert a tool, such as a screwdriver or pencil, into the printer or its mechanism. If the paper tape jams and fails to feed properly, clear it by grasping the tape and pulling it forward through the printer mechanism.

Serial Number

The serial number is located on the back of the case, beneath the compartment door. It's advisable to keep a written record of your serial number, in case you and your HP-10 accidentally become separated.

Warranty

Full One-Year Warranty

The HP-10 is warranted against defects in materials and workmanship for one (1) year from the date of delivery. During the warranty period, Hewlett-Packard will repair or, at

its option, replace at no charge, components that prove to be defective, provided the calculator or accessory is returned, shipping prepaid, to Hewlett-Packard's Customer Service Facility. (Refer to Shipping Instructions.)

This warranty does not apply if the calculator or accessory has been damaged by accident or misuse, or as a result of service or modification by other than an authorized Hewlett-Packard Customer Service Facility. No other expressed warranty is given by Hewlett-Packard. **HEWLETT-PACKARD SHALL NOT BE LIABLE FOR CONSE-QUENTIAL DAMAGES.**

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Out of Warranty

After the one-year warranty period, calculators will be repaired for a moderate charge. All repair work performed beyond the warranty period is warranted for a 90-day period.

Warranty Transfer

If you sell your calculator or give it as a gift, the warranty is transferrable and remains in effect for the new owner until the original one-year expiration data. It is not necessary for the owner to notify Hewlett-Packard of the transfer.

Shipping Instructions

Whether the unit is under warranty or not, it is your responsibility to pay shipping charges for delivery to the Hewlett-Packard Customer Service Facility. Remember to include a sales slip or proof of purchase and a description of the problem on the service card (found in the back of this book).

When warranty repairs are completed, the Customer Service Facility returns the unit with postage prepaid. On out-of-warranty repairs, the unit is returned C.O.D. (covering shipping costs and the service charge).

Warranty Information Toll Free Number

(800) 648-4711 (In Nevada, call collect (702)323-2704.)

General Index

HP-10 Registration Card

Please complete and return this postage-paid card. This will enable us to send future product information to you.

Name / / / / / / / / / / / / / / / / / / /
First   Initial   Last

Date Product Recieved / / / / /
Month   Day   Year

Company /
(Include Bldg., Division, Room No. etc.,)

Street/Box/Route /

City / / / / / / / / / / / / / / / State / / / Zip Code / / / / /

(1) Where was your calculator purchased?

101 ☐ Directly from an HP sales office or factory
102 ☐ By mail from HP
103 ☐ From any retail store

(2) Check the ONE category best describing your job function.

201 ☐ Top Management
202 ☐ Middle Management/ Supervisory
203 ☐ Professional/Technical
204 ☐ Student
205 ☐ Other (Specify) _____

(3) Rank TWO categories of applications for which your HP-10 will be used. (1 for most important, 2 for second.)

301 ☐ Engineering
302 ☐ Physical Science
303 ☐ Natural Science
304 ☐ Computer Science/Data Processing
305 ☐ Aviation/Marine Navigation
306 ☐ Statistics/Mathematics
307 ☐ Financial Analysis
308 ☐ Real Estate/Lending
309 ☐ Budgeting/Forecasting

If you are outside the United States:
- **Return this card in the enclosed warranty envelope.**
- **If no envelope, please mail this card to the nearest Hewlett-Packard Sales and Service Office.**

Service Card

Refer to the appendix of your Owner's Handbook to diagnose a calculator malfunction. The warranty period for your calculator is one year from date of purchase. Unless **Proof of Purchase** is enclosed (sales slip or validation) Hewlett-Packard will assume any unit over 12 months old is out of warranty. (**Proof of Purchase** will be returned with your calculator.) Should service be required, please return your calculator, charger, batteries and this card protectively packaged to avoid in-transit damage. Such damage is not covered under warranty.

Inside the U.S.A.
Complete the reverse side of this card and return items safely packaged directly to:

Hewlett-Packard
Corvallis Division Service Facility
P.O. Box 999
Corvallis, Oregon 97330

We advise that you insure your calculator. All units will be returned via priority mail.

Outside the U.S.A.
Where required please fill in the validation below and return your unit to the nearest designated Hewlett-Packard Sales and Service Office. Your warranty will be considered invalid if this completed card is not returned with the calculator.

Model No.	Serial No.	Date Received

Invoice No./Delivery Note No.

Sold By:

HEWLETT **hp** PACKARD

1000 N.E. Circle Blvd., Corvallis, OR 97330