

Apparently "Vintage"
now means
"What I Once Used"

- Part 1: How Vintage Computing Devices Benefitted Me
- Part 2: The Amazing Curta!
- Part 3: Show and Tell

Kerry Veenstra, K3RRY

Timeline



1975
Sears Calc.
\$80
\$500



1979
HP-29C
\$175
\$750



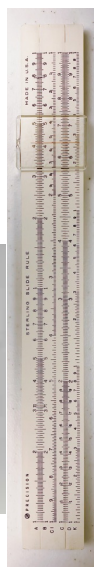
1983
Osborne
\$1,800
\$5,600



1994
HP-200LX
\$749
\$1,600

1962

1972
Adder
\$2.50
\$20



1977
R.S.
\$20
\$100



1980
HP-41C
\$295
\$1,100



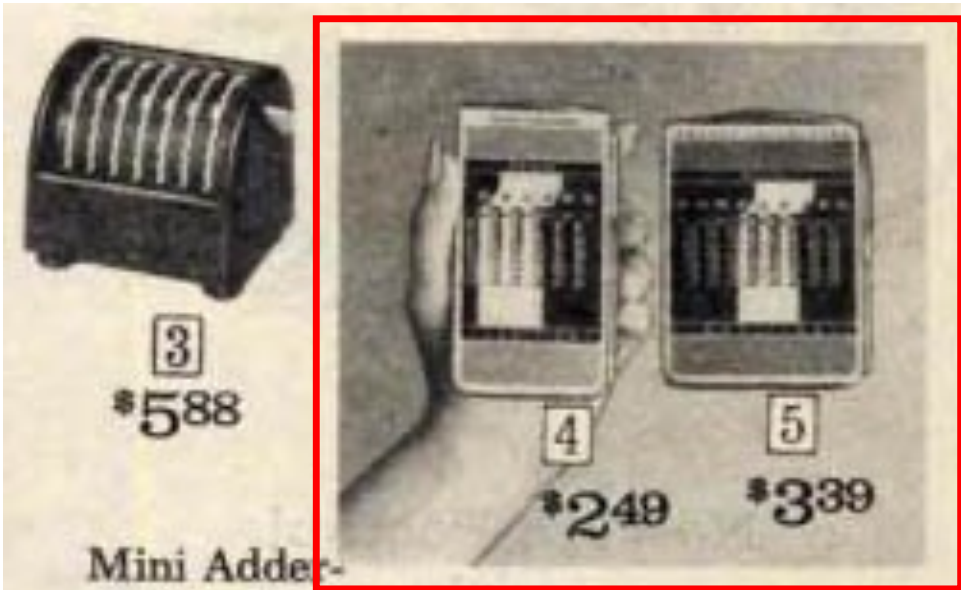
1983
HP-16C
\$125
\$390



1990
T1000SE
\$1,700
\$4,100



Sears Pocket Adder (1972)



3
\$588

4 \$249
5 \$339

Mini Adder-subtracters

3 3½x5x3½ inches. Move levers to add, and subtract. Totals to 9,999,999. Plastic body, Japan. 3 H 5854—Shipping weight 1 lb. 1 oz. \$5.88

(4 and 5) Pocket size. Add on one side, subtract on the other. Slip into pocket or purse. Case and stylus included. Aluminum. From West Germany.

4 Adds to 9,999.99. 2½x5 inches. 3 H 5816—Shipping weight 6 ounces. \$2.49

5 Adds to 9,999,999.99. 3¾x5 inches. 3 H 5817—Shipping weight 7 ounces. \$3.39

Imagine! An Electric Adding Machine specially designed for home use that offers all this:

- Lists 7 columns, totals 8
- Adds, subtracts, multiplies, totals and subtotals
- Has steel computational gears for durability
- Provides a printed tape for your records
- Complete with cord, tape, ribbon, dust cover and instructions

All for only **\$63.95**

1 Quickly, easily, accurately—check bank statements and balance checkbooks, total bills, figure taxes. Lock-down repeat key for multiplication, simplified keyboard with memo-total, add-subtotal combination keys. Plastic body about 13½x19x8 inches. Smart storage with locked water-tight bin. From Japan.

2 H 5854—Shipping weight 9 pounds. Each \$63.95
12 months. See page 1261 for complete disclosure of Credit Terms.

2 Vinyl Carrying Case. Use also for storing machine. 3 H 5875—Shipping weight 3 pounds. \$6.75

Extra Ribbon, Black cotton. Shpg. wt. ea. 4 oz. \$1.99
3 H 2895. Each \$4c; 3 for 2.52

Extra Tape, 3 roll package. Shpg. wt. pkg. 1 lb. 13 oz. 3 H 4326. Each Package \$4c; 2 packages 1.78

1972 Sears Fall-Winter Catalog, Page 1268
christmas.musetechnical.com

You can buy a heavy-duty electric Credit Balance Adder from Sears for only **\$75.50** Lists 7 columns Totals 8

Add, subtracts, multiplies, subtracts, even to a negative balance, quickly and efficiently. Non-add key codes tape for easier identification. In multiplication, keyboard and repeat lever are automatically cleared when total is taken. All entries coded and printed in black. Manual single digit and total clear lever. Heavy-duty steel mechanism. Mist gross plastic body about 13½x19x8 in. high. Ribbon, tape, dust cover incl. Order case 3 H 5842 on pg. 1261. From Italy.

3 H 5810C—Shipping weight 11 pounds. \$75.50

Extra Ribbon, Black cotton. Shpg. wt. ea. 4 oz. 3 H 2896. Ea. \$4c; 3 for \$2.52

Extra Tape, Pkg. of 3 rolls. Shpg. wt. pkg. 1 lb. 13 oz. 3 H 4326. Package \$4c; 2 pkg. \$1.78

NOTE: Electric adder on this page operates on 110-120 volt, 60 cycle AC. U.S. listed.



3 \$588
4 \$249
5 \$339

Mini Adder-subtracters

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(4 and 5) Pocket size. Add on one side, subtract on the other. Slip into pocket or purse. Case and stylus included. Aluminum. From West Germany.

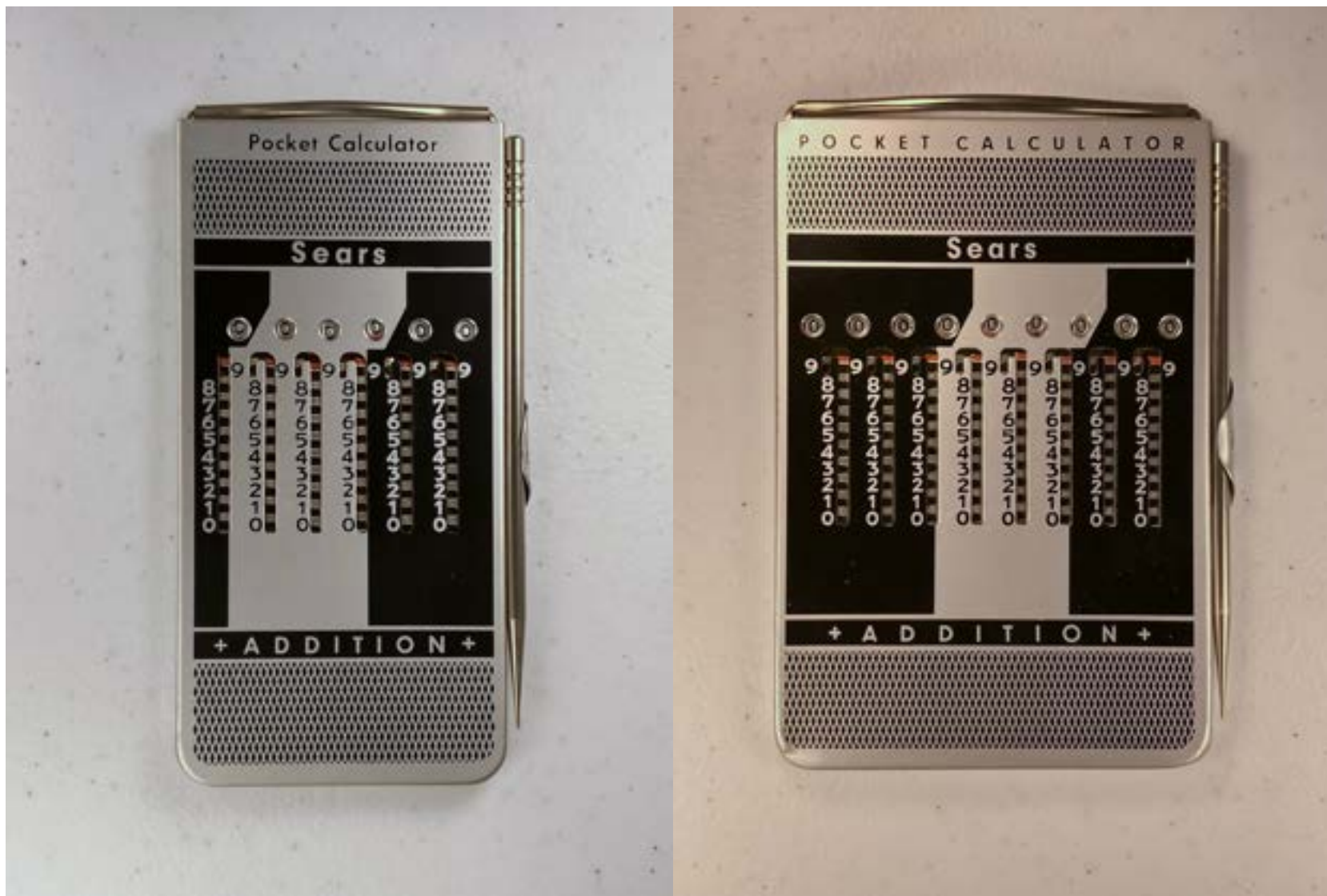
4 Adds to 9,999.99. 2½x5 inches. 3 H 5816—Shipping weight 6 ounces. \$2.49

5 Adds to 9,999,999.99. 3¾x5 inches. 3 H 5817—Shipping weight 7 ounces. \$3.39

Adding Machine Tapes and Ribbons

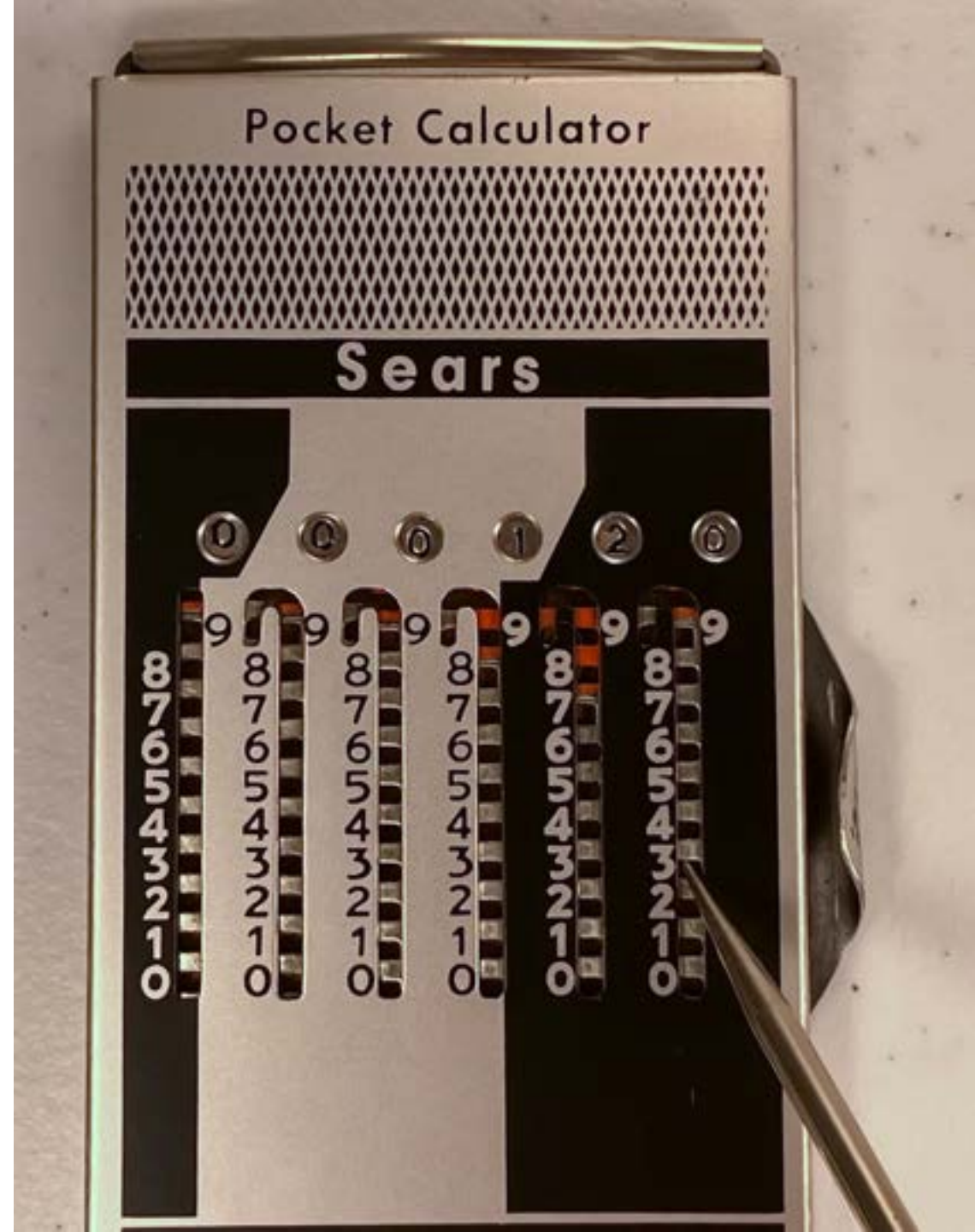
Adding Machine Ribbons, Shipping weight each 4 ounces.						Adding Machine Tapes, Hard Edges, white bond, 3 rolls to package.						
Adder make and model number for your machine	Carriage Number	Color	Type	Length	Price per	Adder make and model number for your machine	Carriage Number	Width/Length	Weight	Shpg. wt. package	Qty. per pkg.	Price per
Sears 405, 505, 505C, 505D, 505E, 505F, 505G, 505H, 505I, 505J, 505K, 505L, 505M, 505N, 505O, 505P, 505Q, 505R, 505S, 505T, 505U, 505V, 505W, 505X, 505Y, 505Z, 505AA, 505AB, 505AC, 505AD, 505AE, 505AF, 505AG, 505AH, 505AI, 505AJ, 505AK, 505AL, 505AM, 505AN, 505AO, 505AP, 505AQ, 505AR, 505AS, 505AT, 505AU, 505AV, 505AW, 505AX, 505AY, 505AZ, 505BA, 505BB, 505BC, 505BD, 505BE, 505BF, 505BG, 505BH, 505BI, 505BJ, 505BK, 505BL, 505BM, 505BN, 505BO, 505BP, 505BQ, 505BR, 505BS, 505BT, 505BU, 505BV, 505BW, 505BX, 505BY, 505BZ, 505CA, 505CB, 505CC, 505CD, 505CE, 505CF, 505CG, 505CH, 505CI, 505CJ, 505CK, 505CL, 505CM, 505CN, 505CO, 505CP, 505CQ, 505CR, 505CS, 505CT, 505CU, 505CV, 505CW, 505CX, 505CY, 505CZ, 505DA, 505DB, 505DC, 505DD, 505DE, 505DF, 505DG, 505DH, 505DI, 505DJ, 505DK, 505DL, 505DM, 505DN, 505DO, 505DP, 505DQ, 505DR, 505DS, 505DT, 505DU, 505DV, 505DW, 505DX, 505DY, 505DZ, 505EA, 505EB, 505EC, 505ED, 505EE, 505EF, 505EG, 505EH, 505EI, 505EJ, 505EK, 505EL, 505EM, 505EN, 505EO, 505EP, 505EQ, 505ER, 505ES, 505ET, 505EU, 505EV, 505EW, 505EX, 505EY, 505EZ, 505FA, 505FB, 505FC, 505FD, 505FE, 505FF, 505FG, 505FH, 505FI, 505FJ, 505FK, 505FL, 505FM, 505FN, 505FO, 505FP, 505FQ, 505FR, 505FS, 505FT, 505FU, 505FV, 505FW, 505FX, 505FY, 505FZ, 505GA, 505GB, 505GC, 505GD, 505GE, 505GF, 505GG, 505GH, 505GI, 505GJ, 505GK, 505GL, 505GM, 505GN, 505GO, 505GP, 505GQ, 505GR, 505GS, 505GT, 505GU, 505GV, 505GW, 505GX, 505GY, 505GZ, 505HA, 505HB, 505HC, 505HD, 505HE, 505HF, 505HG, 505HH, 505HI, 505HJ, 505HK, 505HL, 505HM, 505HN, 505HO, 505HP, 505HQ, 505HR, 505HS, 505HT, 505HU, 505HV, 505HW, 505HX, 505HY, 505HZ, 505IA, 505IB, 505IC, 505ID, 505IE, 505IF, 505IG, 505IH, 505II, 505IJ, 505IK, 505IL, 505IM, 505IN, 505IO, 505IP, 505IQ, 505IR, 505IS, 505IT, 505IU, 505IV, 505IW, 505IX, 505IY, 505IZ, 505JA, 505JB, 505JC, 505JD, 505JE, 505JF, 505JG, 505JH, 505JI, 505JJ, 505JK, 505JL, 505JM, 505JN, 505JO, 505JP, 505JQ, 505JR, 505JS, 505JT, 505JU, 505JV, 505JW, 505JX, 505JY, 505JZ, 505KA, 505KB, 505KC, 505KD, 505KE, 505KF, 505KG, 505KH, 505KI, 505KJ, 505KL, 505KM, 505KN, 505KO, 505KP, 505KQ, 505KR, 505KS, 505KT, 505KU, 505KV, 505KW, 505KX, 505KY, 505KZ, 505LA, 505LB, 505LC, 505LD, 505LE, 505LF, 505LG, 505LH, 505LI, 505LJ, 505LK, 505LL, 505LM, 505LN, 505LO, 505LP, 505LQ, 505LR, 505LS, 505LT, 505LU, 505LV, 505LW, 505LX, 505LY, 505LZ, 505MA, 505MB, 505MC, 505MD, 505ME, 505MF, 505MG, 505MH, 505MI, 505MJ, 505MK, 505ML, 505MM, 505MN, 505MO, 505MP, 505MQ, 505MR, 505MS, 505MT, 505MU, 505MV, 505MW, 505MX, 505MY, 505MZ, 505NA, 505NB, 505NC, 505ND, 505NE, 505NF, 505NG, 505NH, 505NI, 505NJ, 505NK, 505NL, 505NM, 505NN, 505NO, 505NP, 505NQ, 505NR, 505NS, 505NT, 505NU, 505NV, 505NW, 505NX, 505NY, 505NZ, 505OA, 505OB, 505OC, 505OD, 505OE, 505OF, 505OG, 505OH, 505OI, 505OJ, 505OK, 505OL, 505OM, 505ON, 505OO, 505OP, 505OQ, 505OR, 505OS, 505OT, 505OU, 505OV, 505OW, 505OX, 505OY, 505OZ, 505PA, 505PB, 505PC, 505PD, 505PE, 505PF, 505PG, 505PH, 505PI, 505PJ, 505PK, 505PL, 505PM, 505PN, 505PO, 505PP, 505PQ, 505PR, 505PS, 505PT, 505PU, 505PV, 505PW, 505PX, 505PY, 505PZ, 505QA, 505QB, 505QC, 505QD, 505QE, 505QF, 505QG, 505QH, 505QI, 505QJ, 505QK, 505QL, 505QM, 505QN, 505QO, 505QP, 505QQ, 505QR, 505QS, 505QT, 505QU, 505QV, 505QW, 505QX, 505QY, 505QZ, 505RA, 505RB, 505RC, 505RD, 505RE, 505RF, 505RG, 505RH, 505RI, 505RJ, 505RK, 505RL, 505RM, 505RN, 505RO, 505RP, 505RQ, 505RR, 505RS, 505RT, 505RU, 505RV, 505RW, 505RX, 505RY, 505RZ, 505SA, 505SB, 505SC, 505SD, 505SE, 505SF, 505SG, 505SH, 505SI, 505SJ, 505SK, 505SL, 505SM, 505SN, 505SO, 505SP, 505SQ, 505SR, 505SS, 505ST, 505SU, 505SV, 505SW, 505SX, 505SY, 505SZ, 505TA, 505TB, 505TC, 505TD, 505TE, 505TF, 505TG, 505TH, 505TI, 505TJ, 505TK, 505TL, 505TM, 505TN, 505TO, 505TP, 505TQ, 505TR, 505TS, 505TT, 505TU, 505TV, 505TW, 505TX, 505TY, 505TZ, 505UA, 505UB, 505UC, 505UD, 505UE, 505UF, 505UG, 505UH, 505UI, 505UJ, 505UK, 505UL, 505UM, 505UN, 505UO, 505UP, 505UQ, 505UR, 505US, 505UT, 505UU, 505UV, 505UW, 505UX, 505UY, 505UZ, 505VA, 505VB, 505VC, 505VD, 505VE, 505VF, 505VG, 505VH, 505VI, 505VJ, 505VK, 505VL, 505VM, 505VN, 505VO, 505VP, 505VQ, 505VR, 505VS, 505VT, 505VU, 505VV, 505VW, 505VX, 505VY, 505VZ, 505WA, 505WB, 505WC, 505WD, 505WE, 505WF, 505WG, 505WH, 505WI, 505WJ, 505WK, 505WL, 505WM, 505WN, 505WO, 505WP, 505WQ, 505WR, 505WS, 505WT, 505WU, 505WV, 505WW, 505WX, 505WY, 505WZ, 505XA, 505XB, 505XC, 505XD, 505XE, 505XF, 505XG, 505XH, 505XI, 505XJ, 505XK, 505XL, 505XM, 505XN, 505XO, 505XP, 505XQ, 505XR, 505XS, 505XT, 505XU, 505XV, 505XW, 505XX, 505XY, 505XZ, 505YA, 505YB, 505YC, 505YD, 505YE, 505YF, 505YG, 505YH, 505YI, 505YJ, 505YK, 505YL, 505YM, 505YN, 505YO, 505YP, 505YQ, 505YR, 505YS, 505YT, 505YU, 505YV, 505YW, 505YX, 505YY, 505YZ, 505ZA, 505ZB, 505ZC, 505ZD, 505ZE, 505ZF, 505ZG, 505ZH, 505ZI, 505ZJ, 505ZK, 505ZL, 505ZM, 505ZN, 505ZO, 505ZP, 505ZQ, 505ZR, 505ZS, 505ZT, 505ZU, 505ZV, 505ZW, 505ZX, 505ZY, 505ZZ												

Sears Pocket Adder (1972)

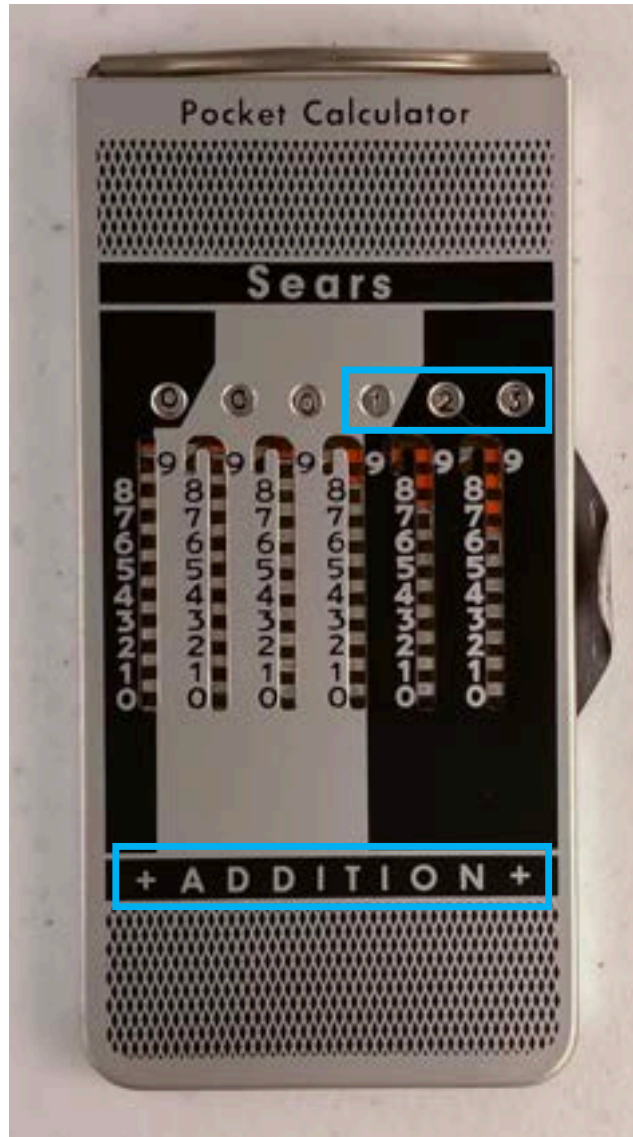


Sears Pocket Adder (1972)

- Created from stamped sheet metal
- Physical "carry" mechanism



Sears Pocket Adder (1972)



Flip for
Subtraction



Sears Pocket Adder (1972)

INSTRUCTIONS

There are only two important rules to follow, i. e.

(1) Slide down holes in white part of slide to 'V'. Push up and turn completely round bend, holes in red part of slide.

(2) When red arrow signal shows upwards, push up from 'V' and turn completely round bend till upper terminal. When arrow shows downwards, push down.

The easiest way to add up long columns of figures is by taking the machine out of its case and placing it on the page underneath the first figure. After the first amount has been set, lower the machine to the next one.

CLEARANCE
Pull the handle at the top of the machine up as far as possible and push it back again. If one or more of the registers show an arrow showing down instead of a zero, insert the style into one of the holes of the column and slide downwards, setting the register to 'V'.

ADDITION
Place the metal point of the style vertically into the hole on the right hand side of the number which you wish to add. If the hole shows white, push downwards until you reach 'V'. If, however, the hole shows red, push upwards and completely round the bend to the upper terminal point.

For additions, use only the front side of the machine.

36.55	Set the figures on the machine in the same sequence as you write them, i. e. put the style into No. '3' of our example in the fourth column from the right and push down to terminal 'V', then take the '6' from the third column from the right and push down all the way, follow up with the two '5's from the second and first columns. The figure 48.23 is now added by drawing down the '3' which shows white, all the way down, while the '5', which shows red, must be pushed upwards and around the bend to the upper terminal. The holes for No. '3' and '5' are again in the white field and should consequently be pushed downwards. The result 84.78 is now shown in the total register.
36.55	The figure 635.37 is subsequently added in exactly the same manner by pushing the number '6' downwards, the number '3' up and around the bend to the upper terminal point, number '5' down, number '3' down, the 'V' now set, this column remains untouched. The result will show in the registers as 718.86.

SUBTRACTION

Figures which you wish to subtract, are handled in exactly the same manner, but on the reverse side of the machine (subtraction side).

8.85	Clear the machine by pulling the handle at the top all the way out and push it back again. Now set the figures '8.85' on the addition side of the machine, turn the machine around and on the reverse side (the subtraction side) set the figures '3.37', i. e. number '3' downwards, number '7' downwards, number '3' upwards and around the bend. The result can now be read off at the total register.
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RED ARROW SIGNAL
A red arrow signal in the total register indicates that, before continuing with the calculations, you should put the style into position 'V' of that particular column, and push all the way up and around the bend.

126.75	After having set the two figures shown in our example, the arrow signal appears in the third window from the right. This indicates that you should insert the style at 'V' of this column and draw upwards all the way and around the bend to the upper terminal point, after which you can read the result, i. e. 170.43 at the total register.
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This simple movement becomes necessary only when adding up long rows or more columns, in those rare instances where it does not work automatically during the operation.

SERVICE CONTROL
It is practically impossible to operate the machine incorrectly because automatic checks inside prevent a white number being pushed up or a red one downwards. The machine blocks automatically and the style cannot reach its terminal point. At the same time, an arrow appears at the upper window. In this case, leave the style inserted in the hole and move it in the direction of the arrow to the opposite end of the machine in order to record a correct reading. The same applies when a red hole is pushed down instead of upwards.

Appendix
If you have wanted to register the red arrow sign which has appeared during your calculations, the machine will still add up correctly. The signal disappears again during further operation or a corrected blocking takes place at the upper curve of the slide, which prevents the style reaching the upper terminal point. This blocking is released and the correct reading appears by drawing from the 'V' of the next column to the left (this is the only case where you do not start from 'V') and push up all the way around the bend to the terminal point.

50.98	When adding the arrow signal will appear when the number 'V' is drawn. If you want to exactly 50.00, the style will be held back by the corrective block, when trying to add the '3'.
50.00	The corrective block is released by placing the style into No. '1' in the second column from the right and pushing up around the bend to the upper terminal point.

MULTIPLICATION AND DIVISION
All multiplications and divisions are quickly done with the MULTOR Circular Calculator. This practical and modern pocket calculator is delivered by the same supplier as your adding machine.

Sears 8 — Pocket Electronic Calculator (1975)

- "dual-powered"—use anywhere
 - batteries
 - 110-120-v., 60-c. AC
- "silently add, subtract, multiply and divide—even give negative answers"

Use these portable Electronic 8-digit Calculators anywhere because they're dual-powered

- Operate on batteries or household current (110-120-v., 60-c. AC)
- Instantly, silently add, subtract, multiply and divide—even give negative answers



With adapter, recharger and black vinyl case

This model includes 3 convenient rechargeable batteries

Very compact size 6 1/2 x 3 1/4 in., net wt. **\$79.50**

- Floating decimal automatically positions itself for accurate answer
- Per cent key gives percentage answers automatically

No need to replace batteries. When low—just recharge for use again and again. Calculator does mixed and chain calculations in multiplication and division. Automatic repeat addition and subtraction. Automatic constant for multiplying or dividing a long series of numbers without re-entering the constant. Clear last entry or entire calculation. Signals when capacity is exceeded. Answers appear in large, easy-to-read numbers. Black plastic body. UL listed adapter recharger has 7 1/2 ft. cord, 2.8 watts. Capacity 90,000,000. Operating instructions. See Electronic Calculator Guarantee below. 31 5886C—Shipping weight 2 pounds..... \$79.50



3 special memory keys let you add or subtract figures from memory and recall totals stored in memory.



Works on convenient household 110V/60Hz AC household current. Adapter, recharger, batteries and black vinyl case included.

Amazingly low price for a Calculator with Time-saving "Memory" feature

Very compact size 6 1/2 x 3 1/4 in. **\$108.95**

Has all the features of our \$79.50 calculator at left, including: automatic constant; over-capacity signal; clear key that lets you clear last entry or entire calculation; per cent key that gives percentage add-on or discount automatically; automatic repeat addition and subtraction; chain or mixed calculations in multiplication and division. **PLUS THESE EXTRAS: 3 special memory keys** that lets you "store" an answer while working other problems and also gives you automatic grand totals any time you wish. **Keeps a number in your "store"**—useful feature for students, engineers, etc. A **decimal point** that shifts to position itself automatically so that you can, correct, for 100, 2000, etc. UL listed adapter recharger has 7 1/2 ft. cord. Capacity 90,000,000. 3 watts. Operating instructions. See Guarantee below. Asssembled in Mexico. 31 5887C—Shipping weight 2 pounds..... \$108.95

Even at this low price, an Electronic Calculator with **AUTOMATIC CONSTANT AND AUTOMATIC DECIMAL PLACEMENT**

Only **\$58.95**

Automatic repeat addition and subtraction. Chain and recall calculations in multiplication and division. Clear last entry only or entire calculation. Signals when capacity is exceeded. Operates on 3 AA disposable batteries (included) or household current with adapter sold below. Black plastic. Operating instructions and black vinyl case. Capacity 90,000,000. See Guarantee below. Asssembled in Mexico. 31 5882C—Ship. wt. 2 lbs. **\$58.95**

Extra AA Batteries. Package of 4. Shipping weight package 2 ounces. 31 89871..... Package \$2.97

1 Adapter. Has 7 1/2 ft. cord, 110-120 v., 60-c. AC. U.L. listed. 4 watts. 31 5881—Ship. wt. 10 oz. **\$4.95**



Sears 8 — Pocket Electronic Calculator (1975)

- Easy to play with numbers
 - 12345678×8
 - $1 \div 7$
 - $1 \div 9$
 - $1 \div 6$
 - $12121212 \div 3$



Radio Shack EC-420 Low-Cost "Slide Rule" Calculator (1977)

- Calculator wars had begun!
 - U.S. vs. Japan
 - Inexpensive
- Vacuum Fluorescent Displays
 - Lower power

Choose the Calculator That Fits Your Needs ...

The Little Calculator with a Big Memory
 12⁹⁵ With Battery and Filled Pouch
 • 8 Digits with Floating Decimal
 • Automatic Constant • Percent Key
 Radio Shack EC-241. Push buttons, no pencils, and get instant answers with 8-digit accuracy! All arithmetic operations. Two-key memory for continuous sequences. **Model 11** Operates on 9V battery (included) or 120 VAC with adapter. **EC-241** 12.95
 AC Adapter, U.S. listed. **EC-241** 4.95

8-Digit Calculator with 5 Functions & Auto-Constant
 10⁹⁵ Figure Tax without "Taxing" Yourself
 • Percent Key • Floating Decimal
 • Includes Battery and Filled Pouch
 Radio Shack EC-221. Get precise, instant answers to lengthy problems involving all 5 functions: +, -, ×, ÷, %. It also can tax 2+2=3... you can get the answer -- 2.3 that easy! **Model 11** Operates on 9V battery (included) or 120 VAC with adapter. **EC-221** 10.95
 AC Adapter, U.S. listed. **EC-221** 4.95

Full-Feature Calculator with Memory & More
 24⁹⁵
 • Easy-to-Read "Digitron" Display
 • 3-Way Power Option - Takes Rechargeable Cells
 • V, % Sign Change
 • Auto-Constant
 Radio Shack EC-266. Put this math wizard in your pocket or purse. Fully addressable memory actually lets you carry on two calculations at once! Handles thousands budget to college homework. **Model 11** Operates on 2 "AA" cells (included) or on AC with adapter or rechargeable "AA" cells. **EC-266** 24.95
 AC Adapter/Recharger, U.S. listed. **EC-266** 5.95

Deluxe Calculator with "Digitron" Display
 14⁹⁵
 • 3-Way Power Option - Takes Rechargeable Cells • Auto-Constant
 • Square Root Key • Floating Decimal
 Sensational Value!
 Radio Shack EC-251. Seven functions and the latest in display technology -- for under \$15, 8-digit accuracy with a floating decimal that never gets "lost". Error-free in-accuracy. **Model 11**. Use with 2 "AA" cells (included) or on AC with adapter or rechargeable "AA" cells. **EC-251** 14.95
 AC Adapter/Recharger, U.S. listed. **EC-251** 5.95

... Radio Shack's Versatile, All-New '77 Line
 Portable Electronic Calculator with Instant Automatic Tape Printout
 • More "Powerful" Than a Standard Adding Machine, Yet It's Only 2 1/4" x 1 1/4" x 1/2" and 1 1/2 Lbs. Light
 • Floating Decimal Made for All-Purpose Calculations
 • Fixed 2-Decimal Mode for Monetary Problems
 • Easy-to-Read Printout • Percentage Key
 • 3-Way Power Option - Takes Rechargeable Cells
 • Automatic Constant • Eight-Digit Accuracy
 With AC Adapter/Charger **119⁹⁵**
 Radio Shack EC-286. "Hard copy" output eliminates common user errors! You entered the correct numbers and functions, but got a persistent record which is easy to follow -- each entry is coded with the appropriate symbol: +, -, ×, ÷, =, Auto-Constant, %, V, or = (negative) symbols. For dollars-and-cents addition and subtraction, use the fixed decimal mode with standard 2-decimal mode. Switch to floating mode for full trading decimal. Percent key quickly figures sales tax, discount, markup. Automatic constant lets you multiply and divide repeatedly by the same factor, without re-entering the constant. Uses standard office paper. A modular U.S. listed AC adapter/battery charger (included) solves "power problems", or you use a rechargeable cells. **Model 11**. **EC-286** 119.95

Low-Cost "Slide-Rule"
 19⁹⁵
 • "Digitron" Display
 • Full Memory
 • With Special "PI" Key
 • Does Percents, Squares, Square Roots, Reciprocals
 Radio Shack EC-420. Fully addressable memory with constant register, sign change, square roots. **Model 11**. Use with 2 "AA" cells (included) or on AC with optional adapter. **Model 11**. **EC-420** 19.95
 AC Adapter, U.S. listed. **EC-420** 4.95

Our Finest Scientific Slide-Rule Calculator
 39⁹⁵ Easy-to-Read "Digitron" Display
 • Five Independent Memories
 • 3-Level Parenthetical Operation
 • Algebraic Logic
 • 3-Way Power Option - Takes Rechargeable Cells
 Radio Shack EC-495. Especially useful to the professional. Among its features: capabilities are constant key, exponent and log functions, parentheses, plus/minus/absolute value calculations, polar and rectangular conversions and a summing mode. All use trigonometric conversions out to five fixed base, 8-digit responses, 8-digit exponent display with signs. Chosen-included in IEC/IEEE/DEC or decimal equivalents. Your choice is shown in floating or fixed decimal mode. **Model 11**. **EC-495** 39.95
 AC Adapter/Recharger, U.S. listed. **EC-495** 14.95

statesman **LESS THAN 1/4" THICK -- PERFECT FOR POCKET OR PURSE!**
 29⁹⁵
 • Extra-Large Green "Digitron" Display
 • Automatic Constant • Floating Decimal
 • Built-In Nickel Cadmium Power Cell
 • Includes U.S. Listed AC Adapter/Recharger
 Radio Shack EC-340. So slim you'll forget it's in your briefcase. But it has double memory and precision accuracy. Special reverse equals key makes 2 divisions a snap. **Model 11**. **EC-340** 29.95
 AC Adapter/Recharger, U.S. listed. **EC-340** 5.95

3 Radio Shack EC-266. The checkbook-size calculator with 4-key memory handles two problems at once -- one in memory, one on the display. Parentheses, logs, square roots, reciprocal, percentage and sign change. **Model 11. **EC-266** 24.95
 AC Adapter/Recharger, U.S. listed. **EC-266** 5.95**

Amazing Capacity at Low Cost
 Big "Digitron" Display **29⁹⁵**
 • Fully Addressable Memory
 • Natural and Common Logs, Trig Functions, Inverse
 Radio Shack EC-489. Goes square, square roots, exponentials. Calculators with 8-digit floating decimal or automatic conversion to 8-digit mantissa with 2-stage exponent. Battery (included) **Model 11**. **EC-489** 29.95
 AC Adapter, U.S. listed. **EC-489** 5.95

Calculator Stand For Pocket Calculators **149**
 Holds calculator for desk-top use. **Model 11**. **EC-221/241/266** 1.49
Deluxe Case Keeps Out Dust **198**
 Fitted vinyl with heavy closure. **Model 11**. **EC-221/241/266** 1.98
Model 11. **EC-221** 1.98

Radio Shack -- 56 Years of Value, Service and Reliability
 www.RadioShackCatalogs.com

Radio Shack EC-420

Low-Cost "Slide Rule" Calculator (1977)

- "Special 'Pi' Key"
- Percent, Squares, Square Roots, Reciprocals
- Good for high-school science classes

Low-Cost "Slide-Rule"

• "Digitron" Display **19⁹⁵**

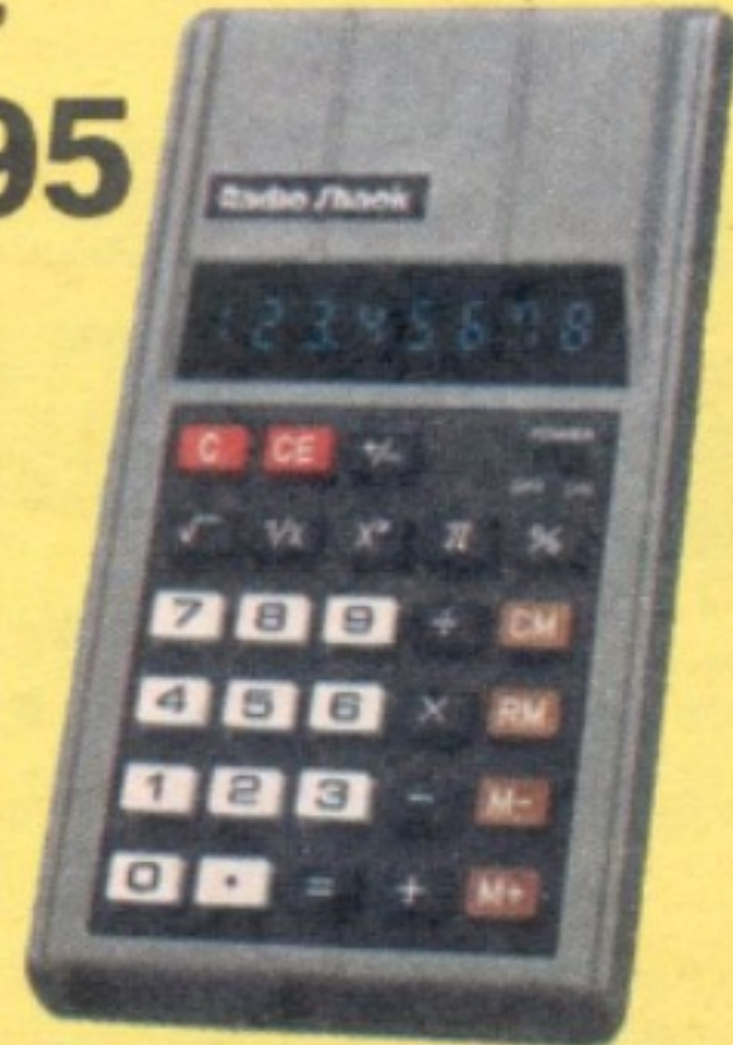
• Full Memory

• With Special "Pi" Key

• Does Percents, Squares, Square Roots, Reciprocals

Radio Shack EC-420. Fully addressable memory with separate register, sign change, more. 6x3x7/8". Uses 2 "AA" cells (included) or AC with optional adapter. With fitted pouch. 65-636 . . . 19.95
AC Adapter. U.L. listed.

65-735 4.95



Radio Shack EC-420 Low-Cost "Slide Rule" Calculator (1977)

- Easy to play with numbers
 - .9 x^2 x^2 x^2 x^2 x^2 x^2 x^2 x^2 x^2 x^2 x^2 x^2
 - .9 \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x}
 - 1.1 \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x} \sqrt{x}
 - 7 $\frac{1}{x}$ $\frac{1}{x}$
 - 9 $\frac{1}{x}$ $\frac{1}{x}$
 - 6 $\frac{1}{x}$ $\frac{1}{x}$



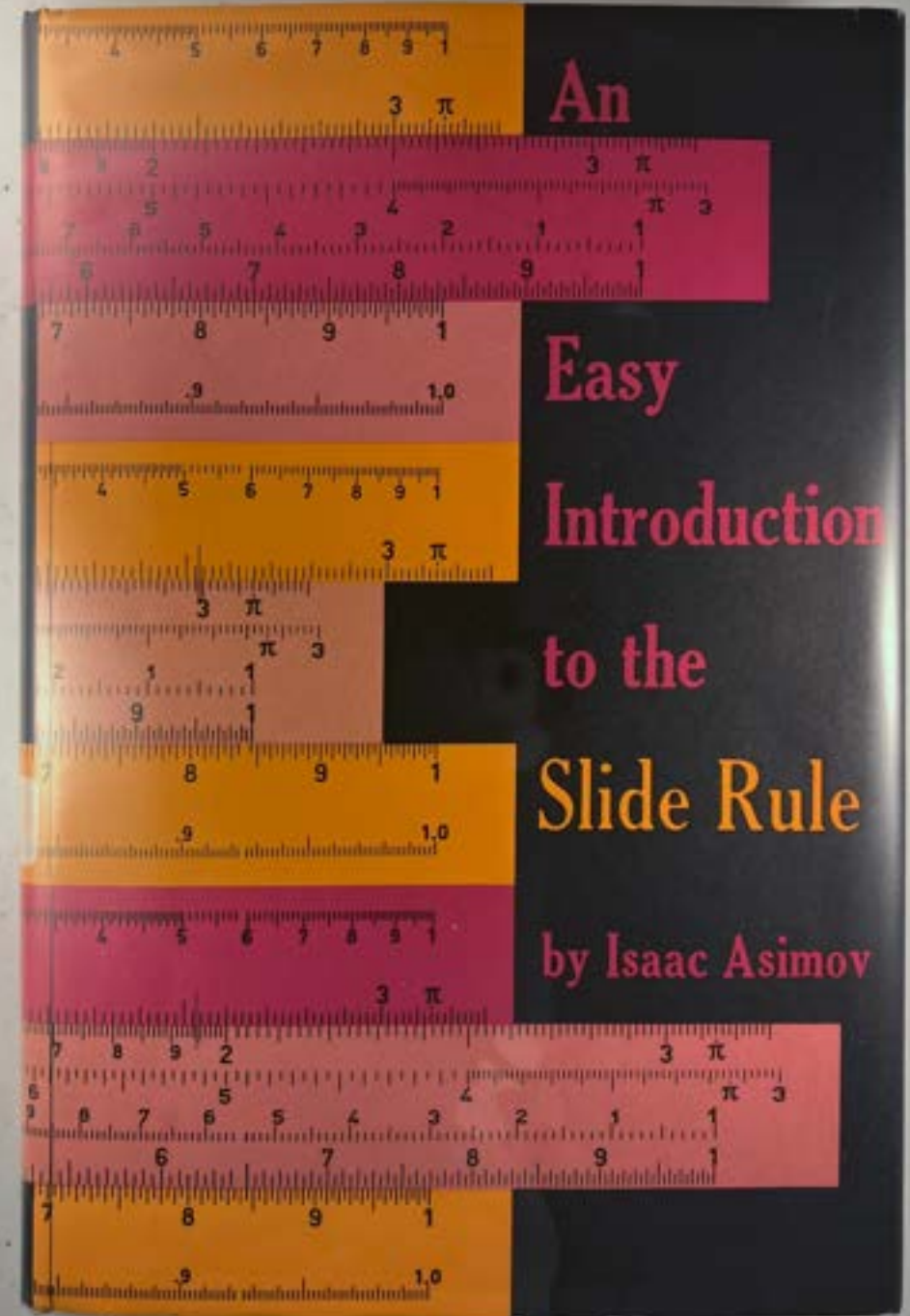
Dad's Sterling Slide Rule (1977)



- Knew that he had it, but I had no interest until . . .

Dad's Slide Rule

- Was browsing through the high-school library
 - Dewey Decimal "500" series = mathematics
- A book about slide rules?
 - by Isaac Asimov?
- Checked it out (first person to do so)



Dad's Slide Rule

- Isaac Asimov taught me about logarithms
- Slide rules add and subtract logarithms

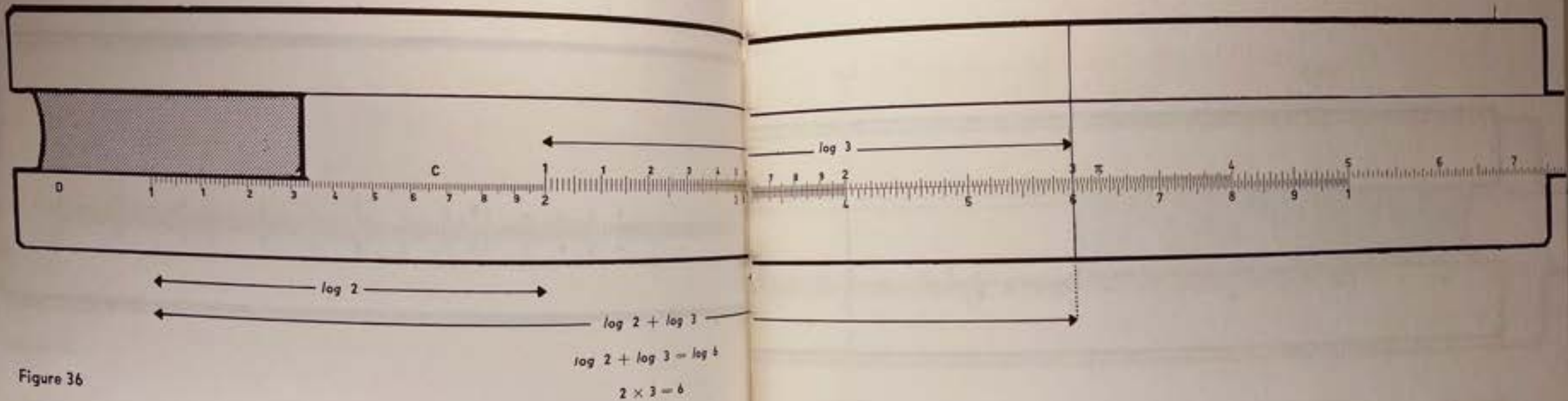


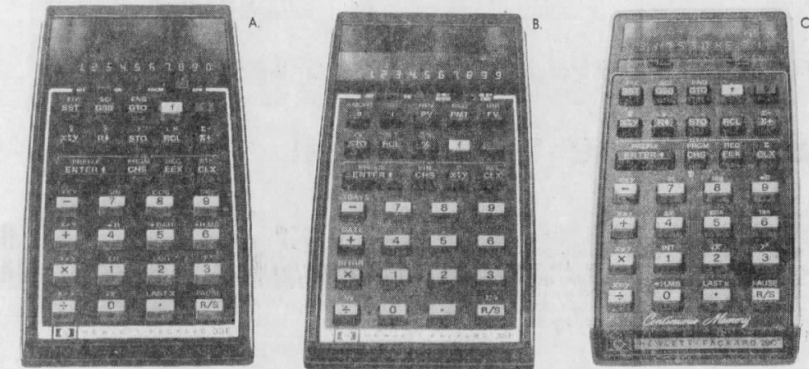
Figure 36

Hewlett-Packard HP-29C Scientific Calculator (1979)

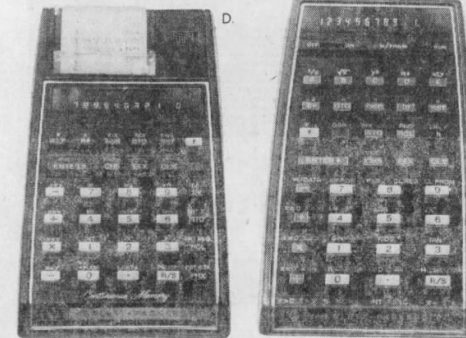
- Somehow convinced my parents to buy me a tool for a working engineer

C. HP-29C, what a memory. Even when turned off, the calculator remembers your program, keeping it ready for use until cleared or rewritten. Orig. 195.00.* Now 175.00.

our collection of hewlett-packard calculators...it's without equal



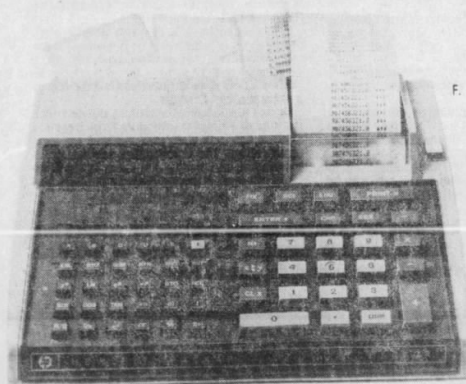
A. HP-33E, the programmable scientist. Here's pocket-size power that includes 49 lines of fully merged keycodes, 8 user memories, editing and conditional keys. 100.00.
 B. HP-38E, the programmable financial advisor. A mini-computer that requires no previous programming experience. Performs cash flow analyses, time/money calculations, much more. 120.00.
 Both the HP-33E and the HP-38E come with a coupon that entitles you to two applications.



C. HP-29C, what a memory. Even when turned off, the calculator remembers your program, keeping it ready for use until cleared or rewritten. Orig. 195.00.* Now 175.00.

built-in thermal printer. Orig. 345.00.* Now 225.00. Additional paper, 6 rolls, 550.
 With your HP-29C or HP-19C purchase we'll give you a coupon which you can redeem for four HP Solution Books, worth 30.00.

E. HP-67, card programmable computer. Insert pre-programmed cards or design and write your own. Up to 224 steps. With 26-addressable storage registers, 3 levels of sub-routines, 10 user definable keys. 450.00.
 F. HP-97, all the capabilities of the HP-67 with quiet, fast thermal printer. 750.00. Additional paper, 6 rolls, 6.00.



With your HP-67 or HP-97 you'll receive a coupon redeemable for five Solution Books and one Application Pac, worth 85.00.

In our HP boutique... You'll find adapters, thermal papers, programming cards, creative programming booklets... all the extra little goodies you might need to get the most from your new HP micro-computer.

hewlett-packard closeout...save 30% to 50%
 HP-21, noncompact scientific calculator, orig. 80.00* 52.50
 HP-27, financial scientific calculator, orig. 175.00* 97.50
 HP-70, financial calculator, orig. 135.00* 65.00.
 Limited quantities. hurry in.

Calculators, Second Floor.
 For a copy of the manufacturer's written warranty prior to purchase, write P.O. Box 2023, New York, NY 10022.
 *intermediate price markdowns may have been taken.

bloomingdale's

Hewlett-Packard HP-29C Scientific Calculator (1979)

Continuous Memory

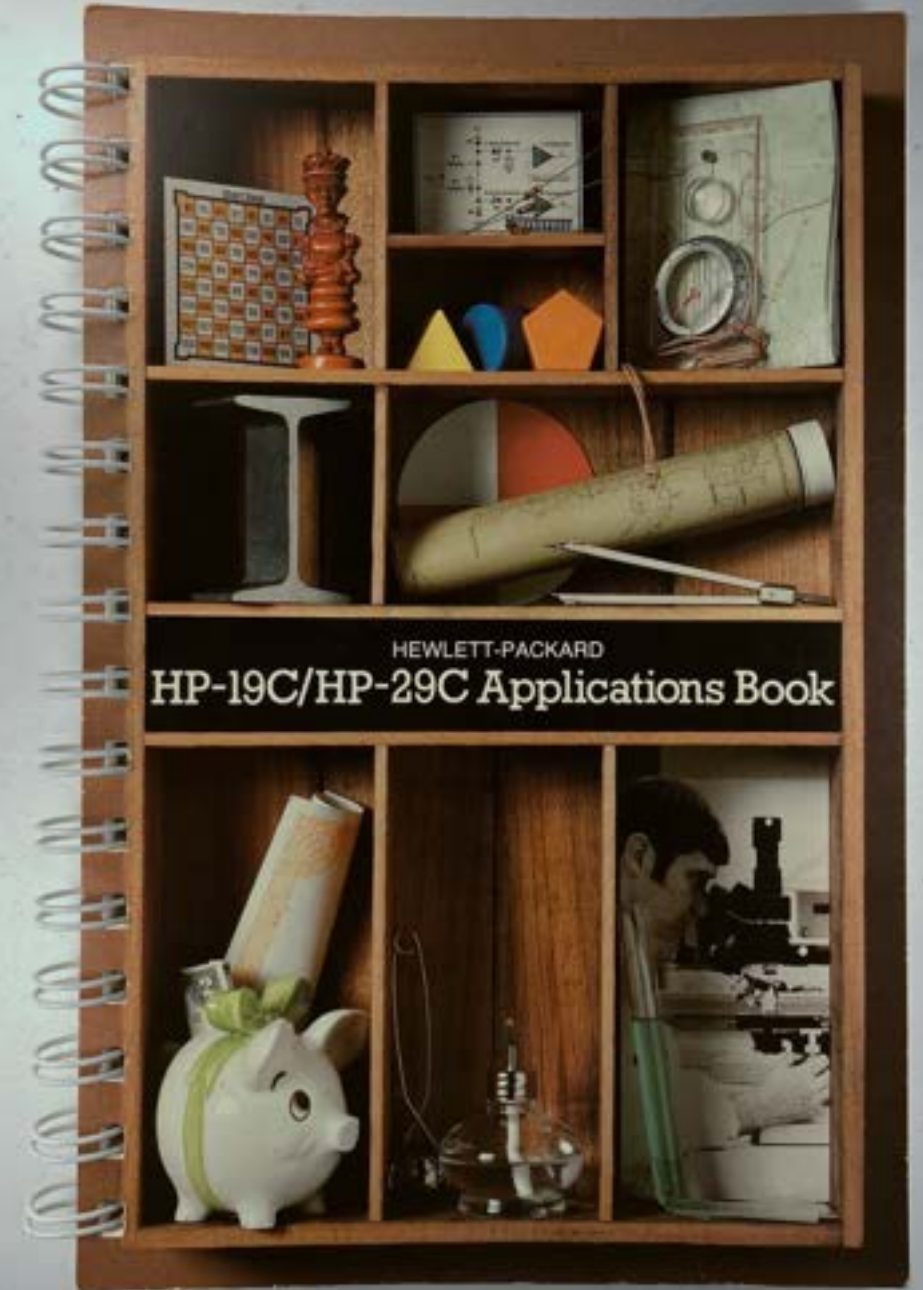
- 98 programming instructions
- Similar to computer assembly language
- Has \log , 10^x , \ln , e^x
- Has time conversions $H \rightleftharpoons H.MS$
- Rectangular \rightleftharpoons Polar Conversions



Hewlett-Packard HP-29C Scientific Calculator (1979)

- But even better, an . . .

Applications Book



Hewlett-Packard HP-29C Scientific Calculator (1979)

- Exposed to concepts that normally I would not have been exposed to

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Hewlett-Packard HP-29C Scientific Calculator (1979)

- "Curve Fitting" (statistics)
- Fit several (x, y) data points to a . . .
 - straight linear line $y = ax + b$
 - exponential curve $y = ae^{bx}$
 - logarithmic curve $y = a + b \ln x$
 - power curve $y = ax^b$
- "coefficient of determination" r^2
 - closer to 1 means a good fit

CURVE FITTING

This program can be used to fit data to:

1. Straight lines (linear regression); $y = a + bx$.
2. Exponential curves; $y = ae^{bx}$ ($a > 0$),
3. Logarithmic curves; $y = a + b \ln x$,
4. Power curves; $y = ax^b$ ($a > 0$).

The regression coefficients a and b are found from solving the following equivalent of linear equations.

$$\begin{bmatrix} n & \sum X_i \\ \sum X_i & \sum X_i^2 \end{bmatrix} \begin{bmatrix} A \\ b \end{bmatrix} = \begin{bmatrix} \sum Y_i \\ \sum Y_i X_i \end{bmatrix}$$

While the relations of the variables are defined as the following:

Regression	A	X_i	Y_i	Code
Linear	a	x_i	y_i	5
Exponential	$\ln a$	x_i	$\ln y_i$	6
Logarithmic	a	$\ln x_i$	y_i	7
Power	$\ln a$	$\ln x_i$	$\ln y_i$	8

The coefficient of determination is:

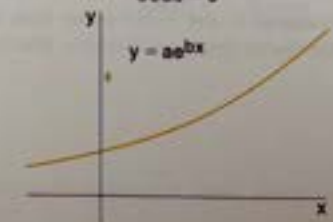
$$r^2 = \frac{A \sum Y_i + b \sum X_i Y_i - \frac{1}{n} (\sum Y_i)^2}{\sum (Y_i^2) - \frac{1}{n} (\sum Y_i)^2}$$

The type of curve fit must be determined before data input begins, that is, by storing the code number into register 0.

Linear Regression
Code = 5

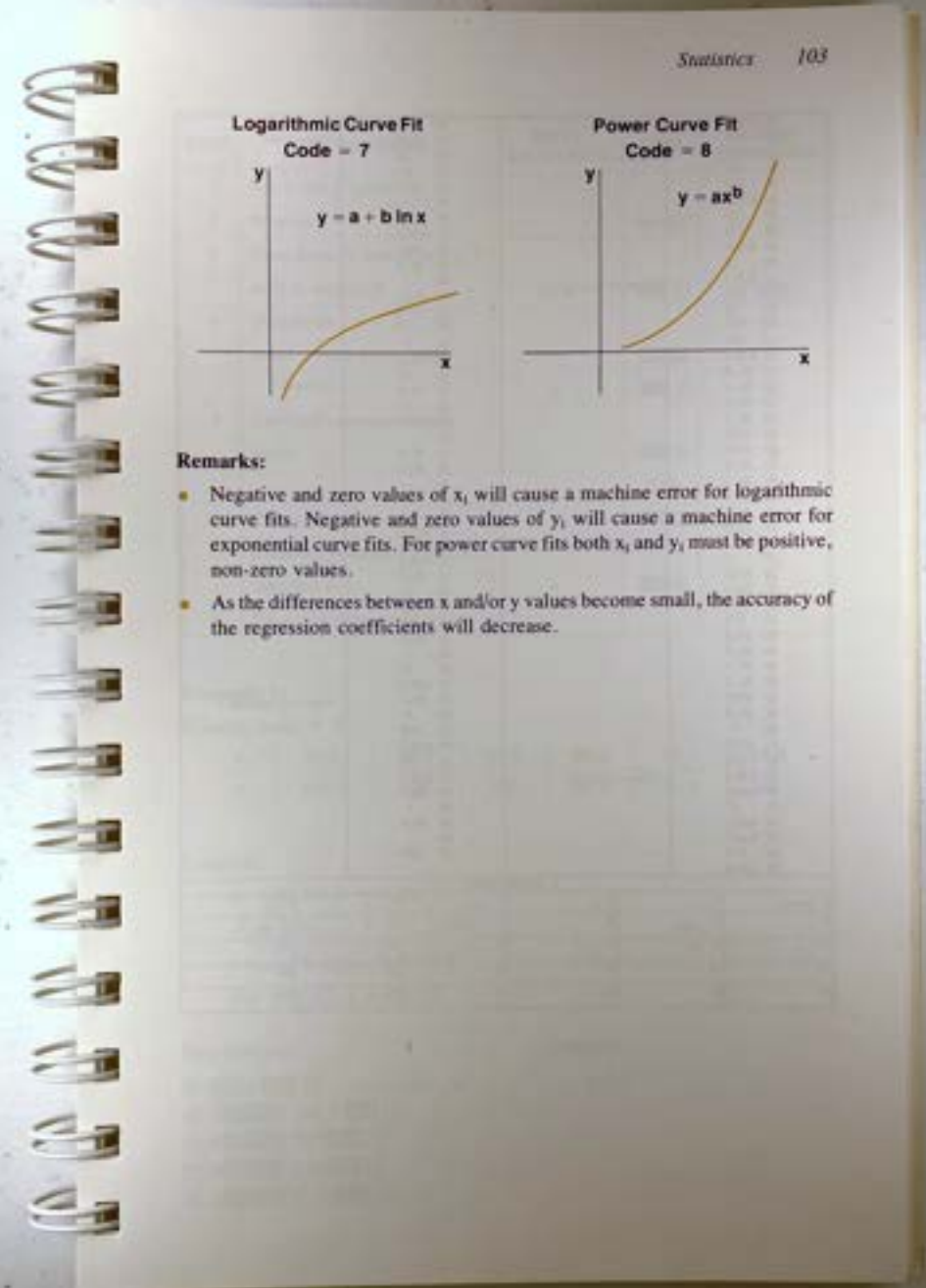


Exponential Curve Fit
Code = 6



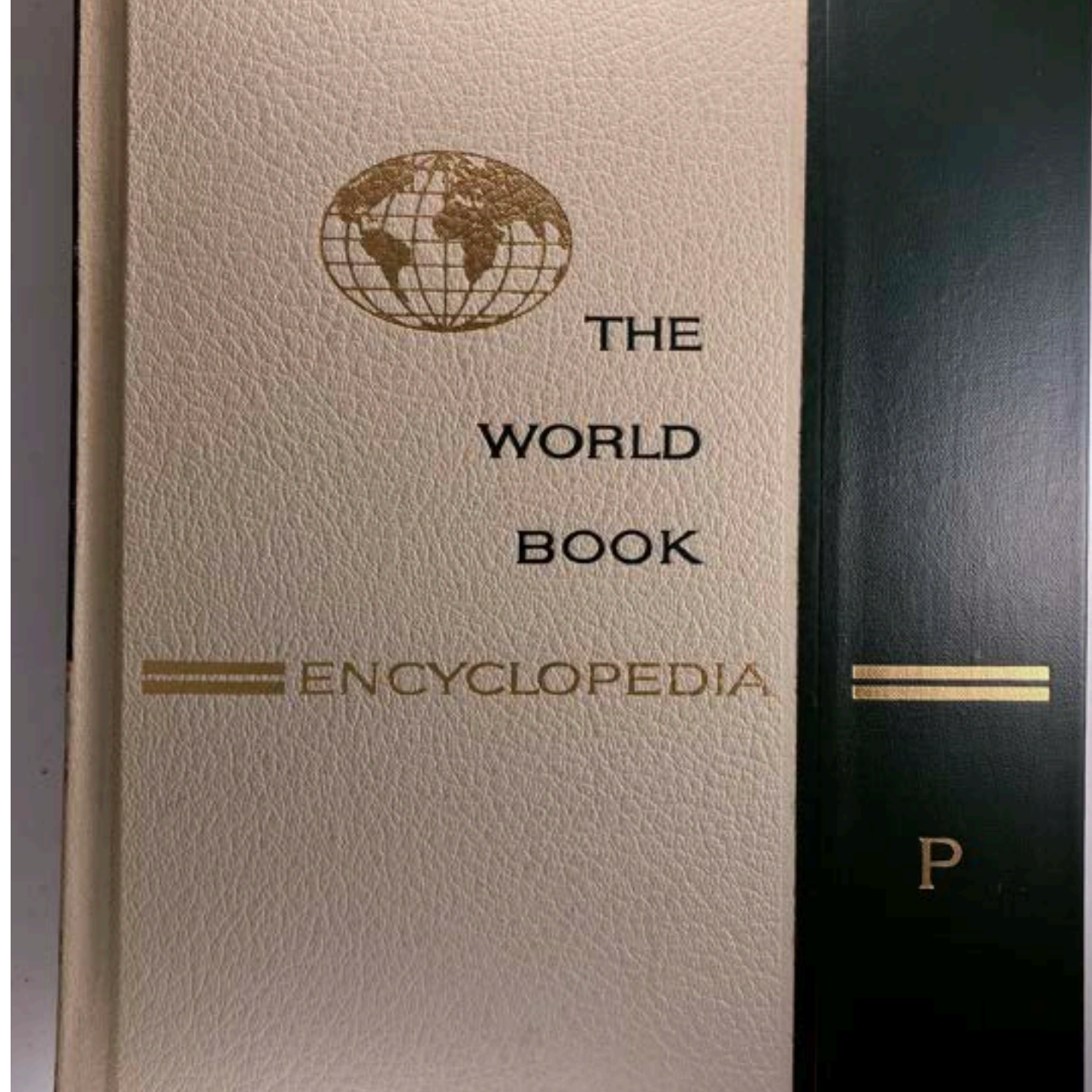
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Hewlett-Packard HP-29C Scientific Calculator

- The World Book
Encyclopedia has data



Vol. P

• Planet

PLANET

PLANET. The planets are the heavenly bodies which move around the sun in nearly circular paths called *orbits*. The name *planet* was given by the ancient Greeks, and means *wanderer* in their language. This name was given because the planets constantly change their positions in relation to the stars.

There are nine planets, and the earth is one of them. Mercury is nearest to the sun, with Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto following in that order.

Mercury, Venus, Mars, Jupiter, and Saturn were known to the ancient astronomers. No one knew that the earth was a planet until the early 1500's, when the great Polish astronomer, Nicolaus Copernicus, showed that the sun was the center of the solar system, and that the earth revolved around it. Before his time, astronomers had believed that the earth was the center of the universe. Uranus was discovered by Sir William Herschel in 1781, and Neptune was located by mathematics in 1846. The ninth planet, Pluto, was not discovered until 1930. It lies a great distance beyond Neptune.

Venus, Mars, Jupiter, and Saturn can be seen easily with the naked eye. Mercury can seldom be seen with the unaided eye because it is so close to the sun that it sinks below the horizon before the sky is completely dark at night. If your eyes are keen, you can sometimes see Uranus on a clear night. A good pair of field glasses or a small telescope is needed to see Neptune.

Planets and Stars. Before the telescope was invented, the only way to tell a planet from a star was by the planet's movement and its steady shining. The stars do not seem to move and their lights twinkle rather than glow. (See **FIXED STAR**.) With the telescope, astronomers could see that planets appeared as round discs. But the distant stars always appeared as points of light, no mat-

ter how much the telescope magnified them. Astronomers today define a star as a body of matter in space which gives off its own light. They believe the stars are gaseous, like our sun, which is a star. The planets are smaller bodies of matter which are no longer gaseous, and which give off no light of their own, but merely reflect the light of our sun.

Size and Distances from the Sun. Except for Mercury and Pluto, the farther the planets are from the sun, the farther they are from each other. The distances are expressed in *astronomical units*. This unit is the average distance of the earth from the sun, or approximately 93,000,000 miles.

The planets differ greatly from one another in size.

THE PLANETS

Planet	Average Distance from Sun (Millions of Miles)	Period of Orbit	Diameter (In Miles)
Mercury	36	88 days	3,100
Venus	67.2	225 days	7,700
Earth	93	365 days	7,927
Mars	141.6	687 days	4,200
Asteroids	135 to 500	643 to 5,000 days	1 to 500
Jupiter	483	11.9 years	88,700
Saturn	886	29.5 years	71,500
Uranus	1,782	84 years	32,000
Neptune	2,794.1	164.8 years	27,700
Pluto	3,700	248.4 years	3,100 to 3,600

The smallest planet is Mercury, which is about one sixteenth the size of the earth. Venus is almost as large as the earth, but Mars is only one seventh as large. Saturn is 730 times as large as our planet. Uranus is sixty-four times as large, and Neptune is sixty times as large as the earth. Jupiter is more than 1,300 times as large as the earth.

This does not necessarily mean that Jupiter, for example, has 1,300 times as much matter as does the earth. The amount of matter in a body depends upon

its volume and its density. The size of the earth, but it has more pounds on earth would weigh as much as Jupiter, his weight would be about 1,300 times as much as the earth. To jump over a ten-foot fence would be like a man jumping over a ditch two feet deep. The earth's weight of 100 pounds would be like a man weighing 100 pounds. The earth could be at home, but it could not be at home. **Classification of Planets.** All planets are classified into two groups. The terrestrial group includes Earth, Mars, Venus, and Mercury. The other group includes Jupiter, Saturn, Uranus, Neptune, and Pluto. The terrestrial group is called major planets because they are much less than those of the other group. The density of the earth is about the same as that of the other planets. A 100 pound man on the earth would weigh 264 pounds on Jupiter. Another method of classification is based on the distance from the sun. The closer planets are called inner planets and the farther planets are called outer planets. A great space lies between the two groups of planets. The number of small planets called asteroids is much greater than that of the other planets. **Movements of Planets.** Every planet moves around the sun and at the same time it spins on its axis. The time it takes to complete one revolution in its orbit is the year. The time it takes to complete one revolution on its axis is the day. The length of the year and the day are shorter than those of the earth. The planets move on their axes more rapidly than the earth.

Related Articles in WORLD BOOK
Asteroids
Comets
Cosmos
Earth
Galaxies
Mars
Mercury
Neptune
Planets
Pluto
Saturn

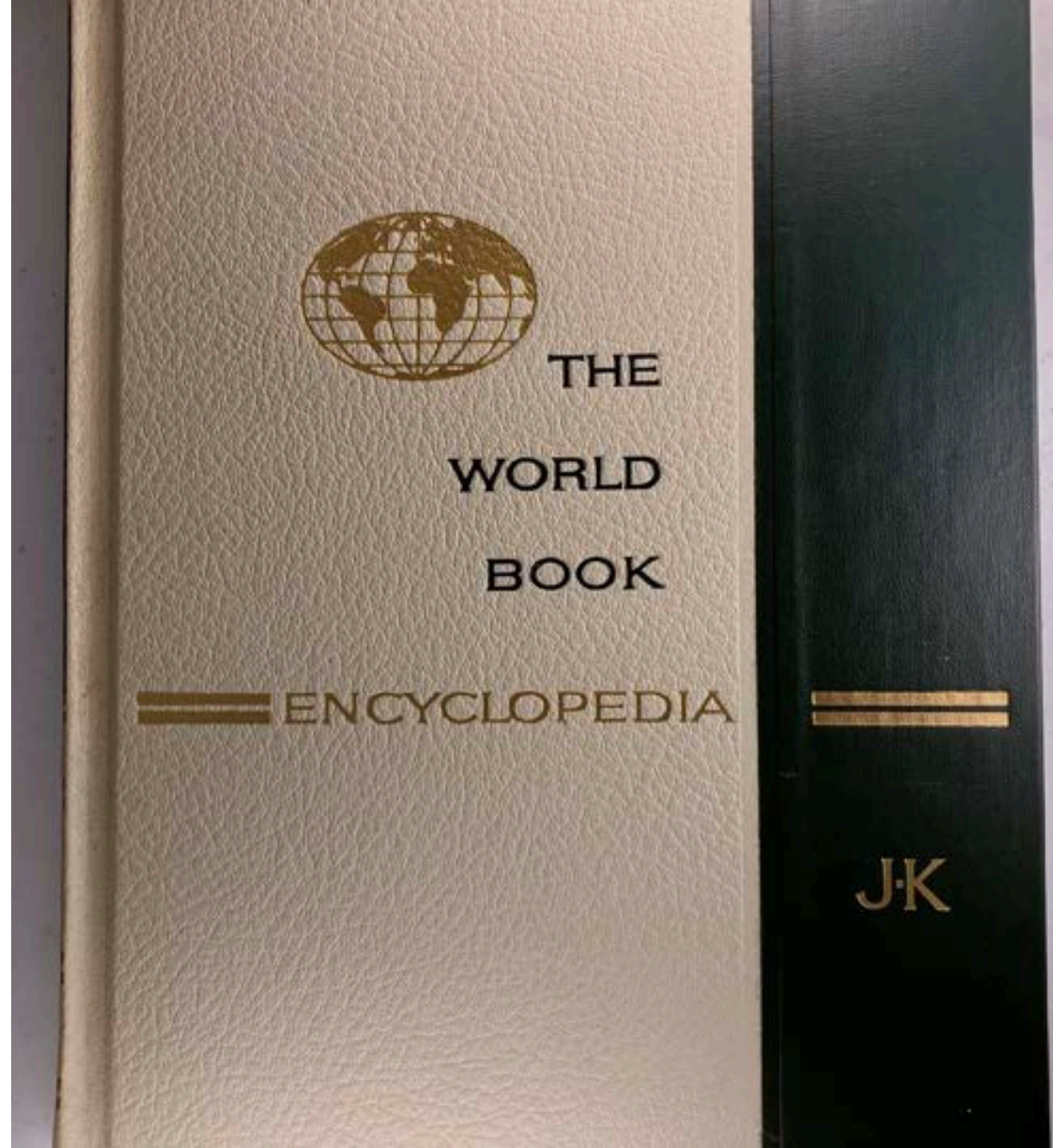
Hewlett-Packard HP-29C Scientific Calculator (1979)

- Data!

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- The World Book Encyclopedia has concepts

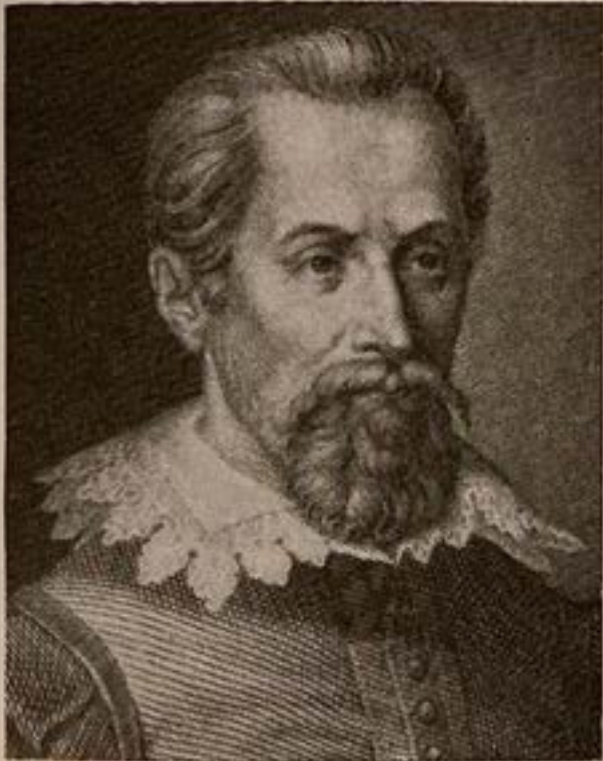


Kepler's Three Laws of Planetary Motion

KEPLER, JOHANNES (1571-1630), a German astronomer and mathematician,

Johannes Kepler

Brown Bros.



discovered three laws of planetary motion. His three laws later formed an indispensable part of the foundation of Sir Isaac Newton's discovery of universal gravitation (see ELLIPSE; GRAVITATION [Newton's Law of Gravitation]):

(1) Every planet follows an oval-shaped path, or *orbit*, around the sun, called an *ellipse*. The sun is located at one focus of the elliptical orbit.

(2) An imaginary line from the center of the sun to the center of a planet sweeps out the same area in a given time. This means that planets move faster when they are closer to the sun.

(3) The time taken by a planet to make one complete trip around the sun is its *period*. The squares of the periods of two planets are proportional to the cubes of their mean distances from the sun.

Kepler was born at Weil, Germany, and was graduated from the University of Tübingen. He accepted an offer to teach mathematics and other subjects at the Lutheran school in Graz. But he left Graz rather than undergo compulsory conversion to Roman Catholicism. While seeking another post, he formed an association with Tycho Brahe, which shaped the rest of his life (see BRAHE, TYCHO).

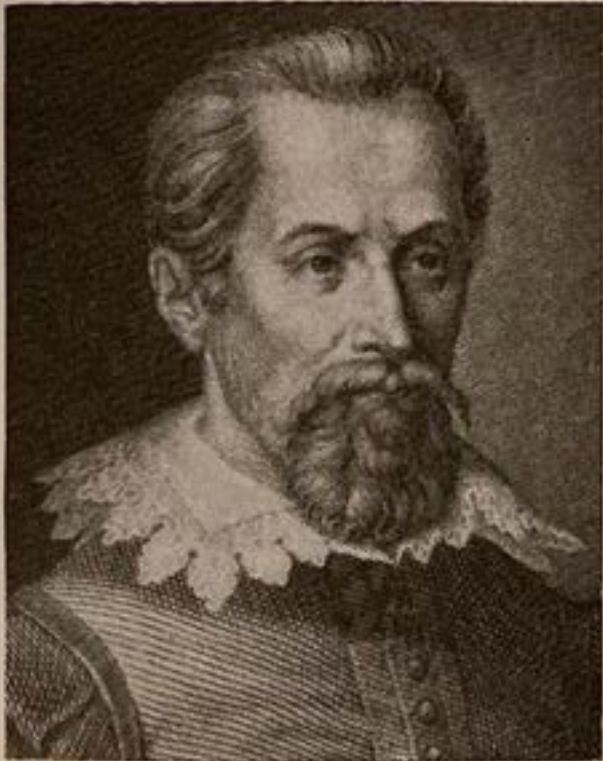
Brahe, the greatest astronomical observer before the introduction of the telescope, needed an assistant, and Kepler joined him. After Brahe died, Rudolph II, the

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Brahe, the great astronomer, died before the introduction of the telescope. Kepler joined him. After Brahe died, Rudolph II, the

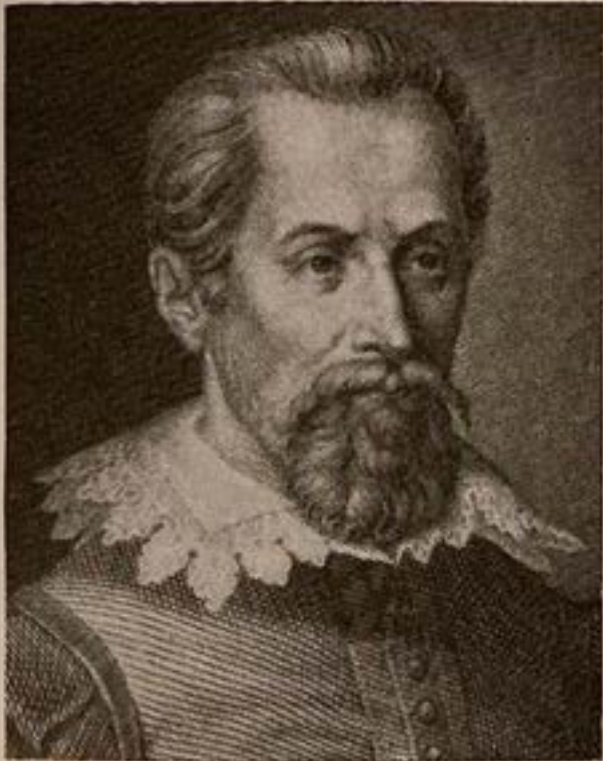
$$y^2 \propto x^3$$

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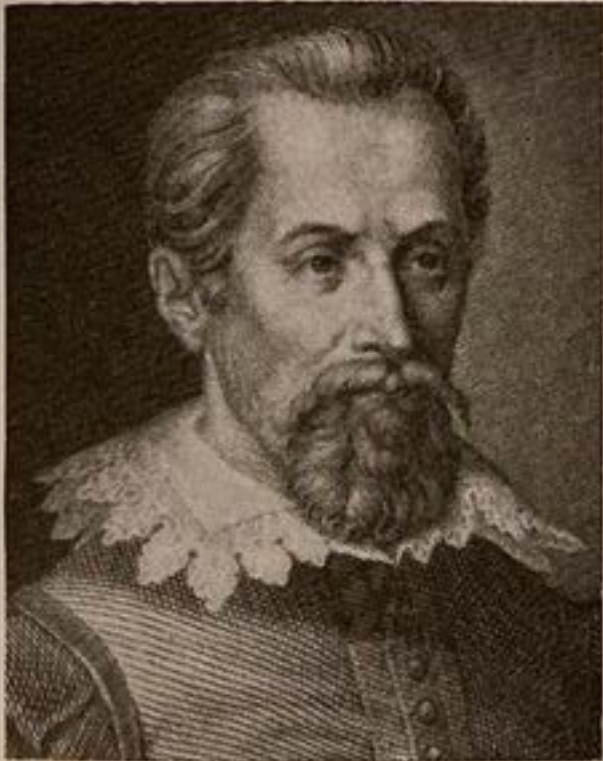
$$y \propto x^{1.5}$$

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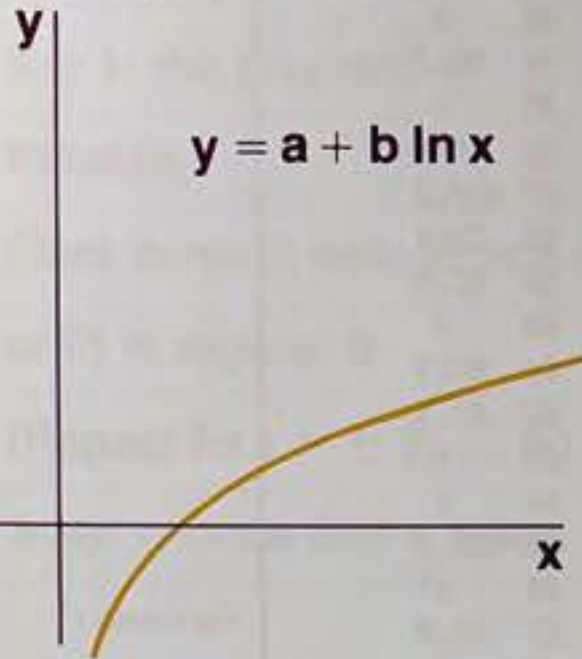
$$y \propto x^{1.5}$$

$$y = a x^{1.5}$$

Hewlett-Packard HP-29C Scientific Calculator (1979)

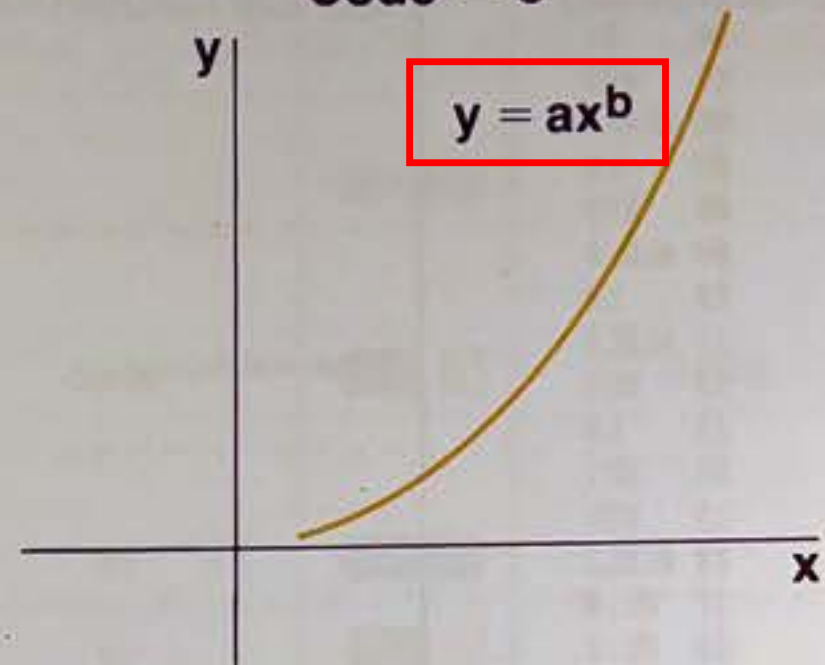
Logarithmic Curve Fit

Code = 7



Power Curve Fit

Code = 8



Hewlett-Packard HP-29C Scientific Calculator (1979)

- Enter the Curve Fitting Program
- Enter the Data

THE PLANETS			
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Neptune	2,792	164.8 years	30,000
Pluto	3,664	247.7 years	3,600

Hewlett-Packard HP-41C Scientific Calculator (1980)

HP introduces new, versatile calculator

By Mike McCracken
Of The Gazette-Times

The Corvallis division of Hewlett-Packard Co. introduced today the most versatile and advanced hand-held calculator it has ever manufactured.

"It's probably the most significant product we've introduced in some time," Glenn Theodore, product manager, said of the new HP-41C.

The HP-41C, which retails for \$295, features a number of revolutionary features that make it a powerful personal computing device useful to the technician, businessman or student, Theodore said.

After more than two years in the development stages, the HP-41C joins the 11 other hand-held models the division produces in Corvallis.

The new calculator was designed at the Corvallis division, and Theodore said much of the division's research and

development department was devoted to the project.

About 90 percent of the calculator's parts will be produced locally, Theodore said.

He said the company hopes to obtain a "significant" revenue growth through sale of the new product, although HP does not publicize many sales figures because of the highly competitive nature of the calculator business.

The company employs 1,250 employees at its Corvallis division and has a monthly payroll of \$1.8 million.

Theodore said production of the new calculator will not require the hiring of large numbers of new employees, and said employment at the firm should continue to grow at about 10 percent per year.

The new calculator is called "alphanumeric" because it "communicates" with the user in both numeric and alphabetic characters.

Users of the calculator can purchase,

at extra cost, a number of options:

— Up to four memory "modules" can be plugged into the back of the calculator to effectively quintuple its memory capacity.

— A plug-in card reader allows the user to enter programs from recorded magnetic cards or to record programs on blank cards:

— A portable thermal, or inkless, printer provides hard copy records of calculations, high-resolution plots, and complete alphabetic and numeric output.

— An optical wand (to be available in 1980) will enable the user to rapidly read and enter programs or data from printed bar codes.

— Sixteen plug-in application modules, offering a variety of additional business and science programs, can be used in addition to the calculator's existing programs.

The HP-41C can be connected to these

devices through four electronic, built-in sockets.

Among its major features, in addition to its ability to "grow" through the use of additional programs, is the calculator's "continuous memory," Theodore said.

This allows information to be retained in the calculator's memory systems after power has been turned off, compared to other calculators which lose memory information when the power is cut.

The calculator, which contains 130 pre-programmed scientific and mathematical functions, also features a liquid crystal display, rather than light-emitting diodes, as used in previous Hewlett-Packard models.

The liquid crystals use far less energy than the diodes, and enable company engineers to build the calculator so that it uses throw-away alkaline batteries rather than rechargeable nickel-cadmium batteries.

While the rechargeable batteries in other calculators have a life of up to six hours before they need to be recharged, the alkaline batteries will last nine months to a year and are more economical, Theodore said.

"The HP-41C is 100 percent faster than earlier HP models, contains up to four times the memory capacity with available options, and has 40 percent more standard functions," President Richard Moore said of the new calculator.

Major markets for the products from the Corvallis division include the United States, Japan and much of Europe, as well as several Latin American countries.

"Introduction of the HP-41C clearly establishes our leadership in the production of hand-held calculators for professional use," Theodore said.

"It is clearly unmatched by any of our competitors."

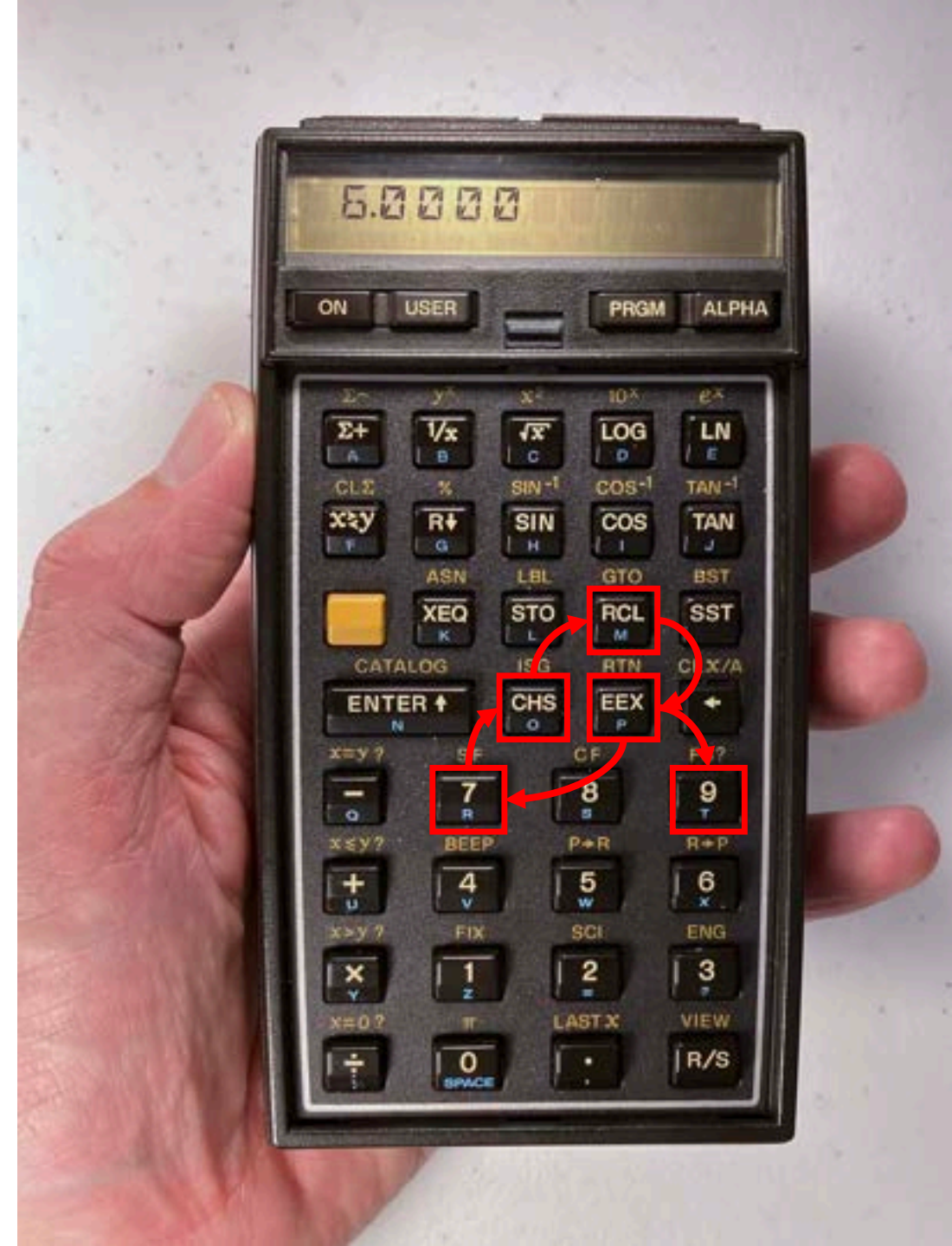
Hewlett-Packard HP-41C Scientific Calculator (1980)

- Many more functions
- Alphabetic keys let you enter functions that are not on the keyboard
- Get good at typing the more common functions
 - [XEQ] [Alpha] P R O M P T [Alpha]



Hewlett-Packard HP-41C Scientific Calculator (1980)

- Many more functions
- Alphabetic keys let you enter functions that are not on the keyboard
- Get good at typing the more common functions
 - [XEQ] [Alpha] **P R O M P T** [Alpha]

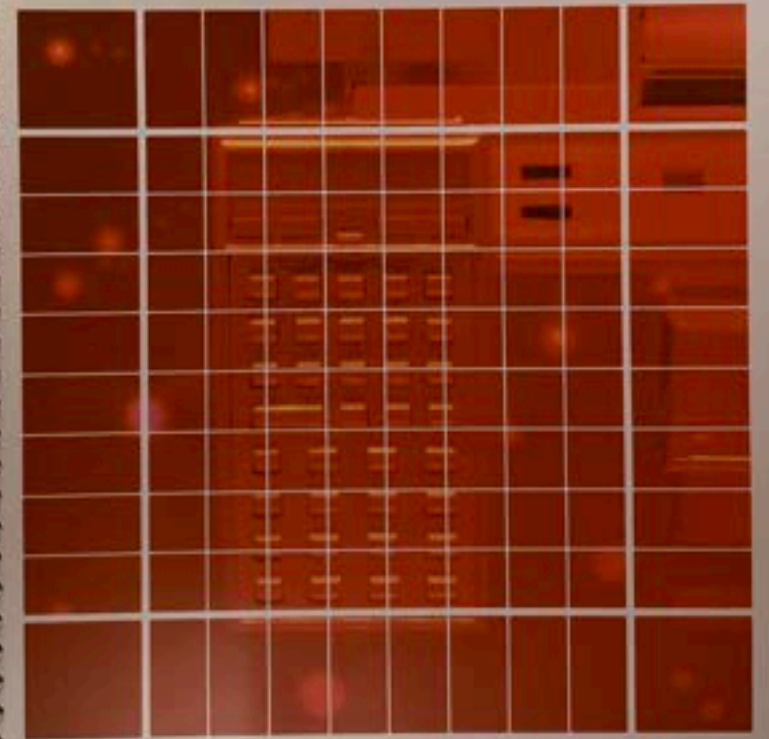


Hewlett-Packard HP-41C Scientific Calculator (1980)

- But even better . . .

**Standard
Applications**

HEWLETT-PACKARD
HP-41C
**STANDARD
APPLICATIONS**



Hewlett-Packard HP-41C Scientific Calculator (1980)

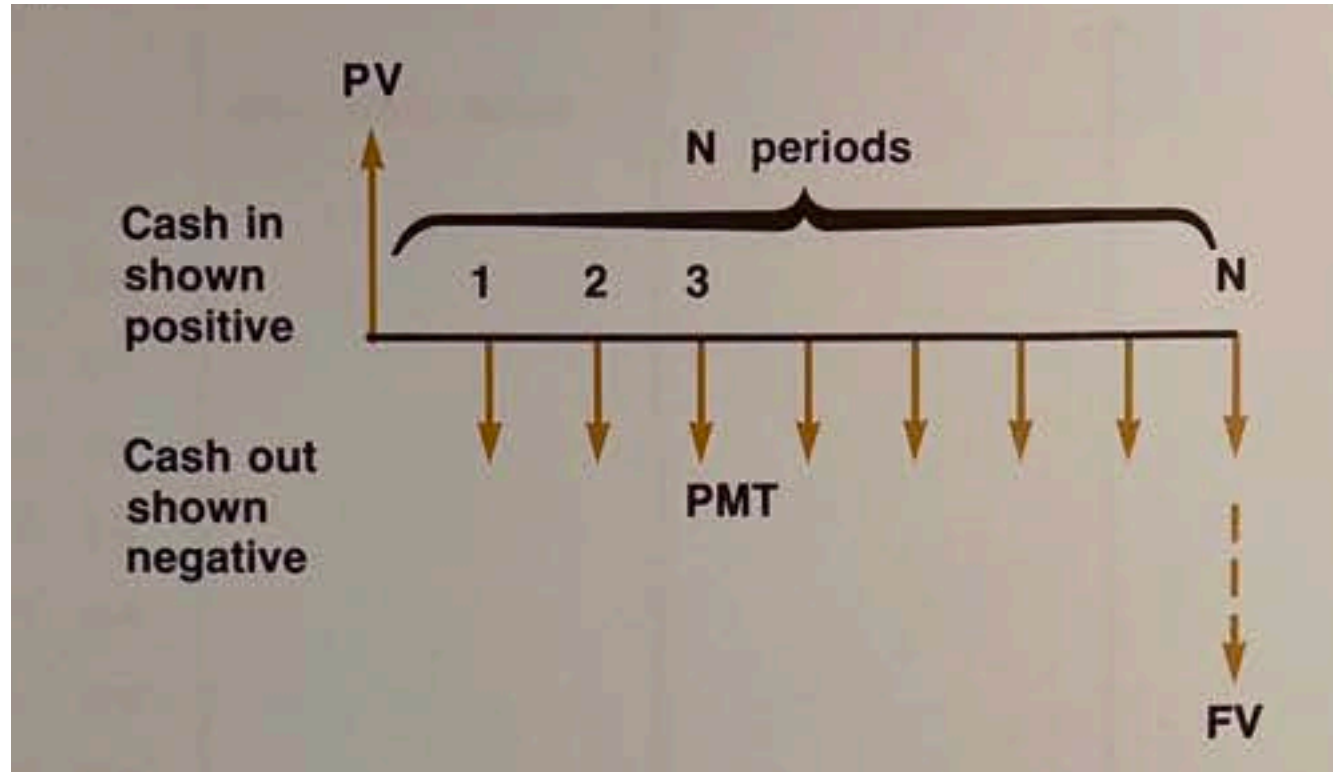
- Exposed to **more** concepts that normally I would not have been exposed to

CONTENTS	
Introduction	3
Format of User Instructions	5
Keying A Program Into The HP-41C	6
RPN Primer	8
Teaches RPN by showing you the stack.	
Calendar Functions	14
Answers most day-date questions.	
Word Guessing Game	18
Try to guess a hidden word.	
Arithmetic Teacher	22
Get 10 problems right and hear a fanfare.	
Hexadecimal-Decimal Converter	28
Converts your favorite numbers to a new system.	
Financial Calculations	32
Converts your HP-41C into a powerful financial calculator.	
Root Finder	38
Locates zeros quickly and accurately.	
Curve Fitting	42
Fits up to 4 curves to your data.	
Vector Operations	50
Allows easy operations with complex numbers.	
Blackjack	54
Plays a simplified game of "21". Requires one additional memory module.	

4

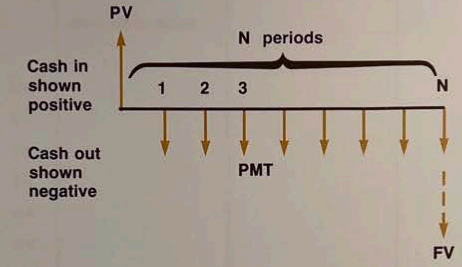
Hewlett-Packard HP-41C Scientific Calculator (1980)

- "Time Value of Money"



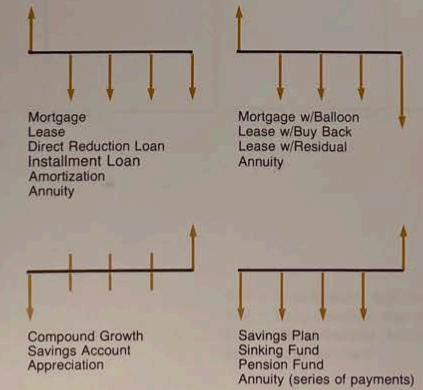
FINANCIAL CALCULATIONS

This program converts your HP-41C into a powerful financial calculator. It has the ability to solve for any of the unknowns relating to a cash flow situation as shown below.



- PV = Present Value: the amount loaned, borrowed, invested, etc.
- I = Periodic Interest rate.
- N = Number of periods.
- PMT = Payment amount: the amount paid on a loan or earned on an investment.
- FV = Future Value: the amount remaining, accumulated, saved, etc.

The sketch above shows a standard loan amortization cash flow from the borrower's point of view. From the lender's point of view, PV would be shown negative and the PMT stream would be positive. By changing the signs of PV, PMT, and FV, different cash flow situations may be realized. Cash flow diagrams for the four basic compound interest problems are presented below along with some of the more common terminology.



Hewlett-Packard HP-41C Scientific Calculator

Schematic!

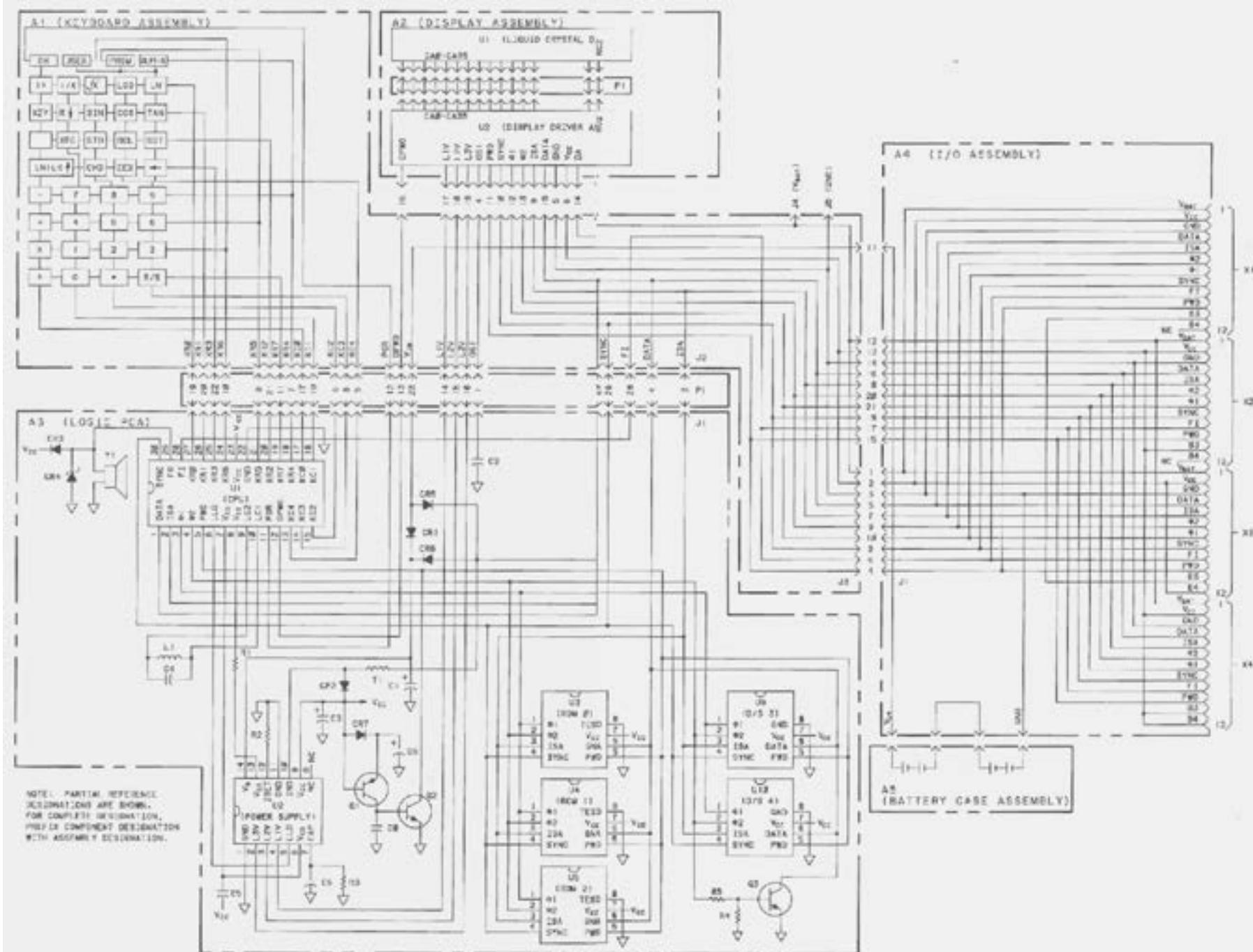
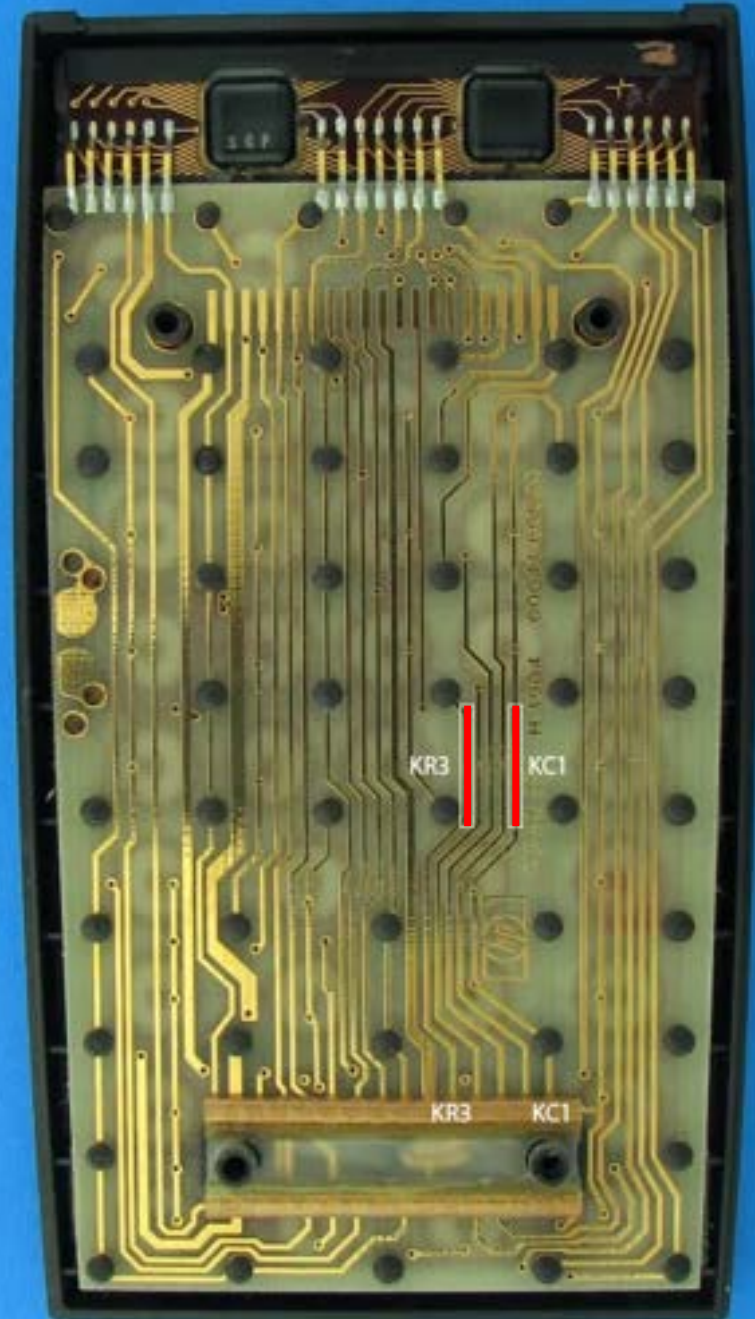


Figure 4-9a. Initial HP-41C Schematic Diagram

Hewlett-Packard HP-41C Scientific Calculator (1980)

- Hack the Calculator
 - Add a button (magnetic reed switch) where a pushbutton really should have been.
- Firmware was robust!
 - I could assign a program to the "phantom" key!



Hewlett-Packard HP-16C Programmer's Calculator (1983)

New calculators to go on sale July 1

By Bill Thompson
Of The Gazette-Times

Two new calculators developed and built by engineers at the Corvallis Division of Hewlett-Packard Co. this year will go on sale worldwide July 1.

"The HP-15C and HP-16C slim-line programmable calculators were introduced this week at the Consumer Electronics Show in Chicago," said Tom Darnall, an HP product spokesman in Corvallis.

"The HP-15C, which sells for \$135, is the company's most powerful calculator. It includes an unprecedented number of math, science and engineering functions and will be able to han-

dle complex numbers and a grid of numbers that can be manipulated.

"The HP-16C, which sells for \$150, is the first programmable calculator for computer scientists — a highly specialized product aimed at a narrow band of professionals."

Darnall said work on both calculators had been going on for several years and that the Corvallis division will build eight main products, in addition to numerous accessories.

They are the HP-11, 12, 15 and 16 calculators, the HP-41 hand-held computer and the HP-80, 85 and 87 personal computers.

"Unlike the HP-15 calculator, I don't think the average person could make much sense of the HP-16C, which is designed for people who work with computer language," Darnall said.

"The HP-16C marks the company's entry into highly specialized calculators, and is seen as one way to retain HP's competitive edge over the Japanese.

"The Japanese have not taken an interest in specialized products up to now, while we have always been one step ahead of them. The company plans to continue to stay ahead, and this gives us an edge on the market."

Eric Evett, software project manager at the Hewlett-Packard's Palo Alto, Calif., headquarters, said the HP-15C would be invaluable for solving systems of linear equations.

"A seven-equation system could take hours to solve with a pencil, paper and conventional calculator," he said, "but it takes only 28 seconds on the HP-15C."

FFFFFFFF h



SL A	SF B ASR	RL C RLC	RR D RRC	RLn E RLCn	RRn F RRCn	MASKL 7 #B	MASKR 8 ABS	RMD 9 DBLR	XOR ÷ DBL÷
$x \rightarrow (i)$ GSB STB	$x \rightarrow I$ GTO STO	SHOW				SB 4 SF	CB 5 CF	B? 6 F?	AND × DBL×
(i) R/S STB	I SST STO	PRGM R↓ R↑	CLEAR REG $x \rightarrow y$ PSE	PREFIX BSP CLX	WINDOW ENTER LST x	1'S 1 $x \leq y$	SET COMPL 2'S 2 $x < 0$	UNSGN 3 $x > y$	NOT - $x > 0$
ON	f	g	WSIZE STO ←	FLOAT RCL →	MEM 0 $x \neq y$	STATUS · $x \neq 0$	EEX CHS $x = y$	OR + $x = 0$	

HEWLETT · PACKARD

Osborne Executive 8-bit "Luggable" Computer (1983)

- The computer that killed the company
- Less expensive during Chapter 11 bankruptcy protection
- Used to write programs for Berkeley classes



Toshiba T1000SE

"Laptop" Computer (1990)

- First personal "laptop" computer
- Best screen!
- Battery-backed SRAM disk for storage



Toshiba T1000SE

"Laptop" Computer (1990)

- Battery eventually wore out
- Replaced with RC Car battery taped to the outside



- Didn't look *too much* like Dynamite!



Hewlett-Packard HP-200LX "Palmtop" Computer (1994)

- Computers are getting smaller!
- Last MS-DOS computer that I bought
- At work, engineers didn't have laptops, but I had a "palmtop"!
 - Having a spreadsheet in meetings is valuable.
 - Also had a symbolic-math program.



Timeline

1962

1972
Adder
\$2.50
\$20



1977
R.S.
\$20
\$100



1980
HP-41C
\$295
\$1,100



1983
HP-16C
\$125
\$390



1990
T1000SE
\$1,700
\$4,100



1975
Sears Calc.
\$80
\$500



1979
HP-29C
\$175
\$750



1983
Osborne
\$1,800
\$5,600

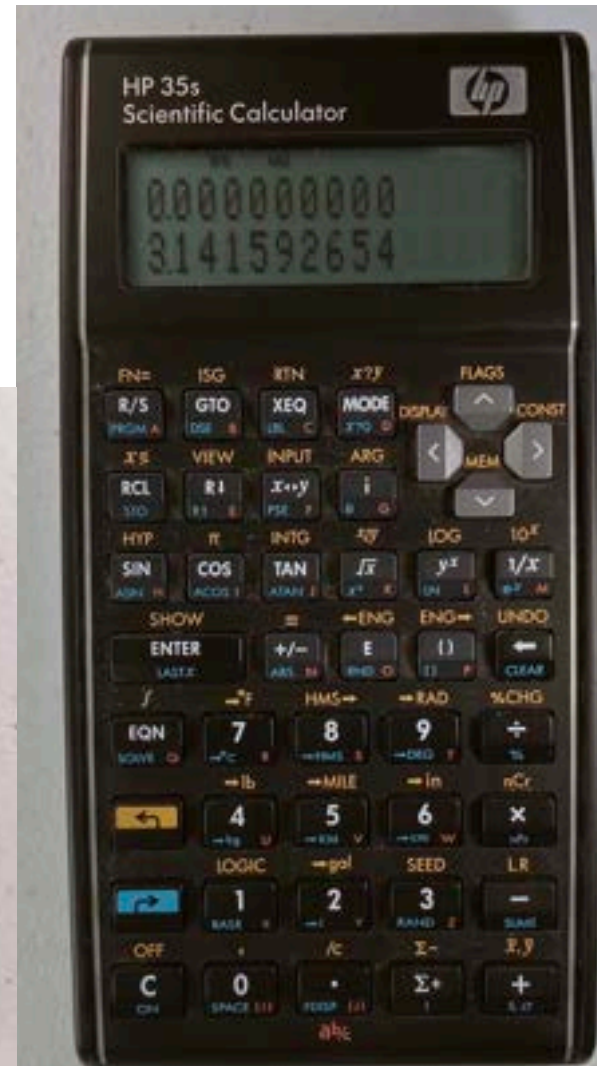
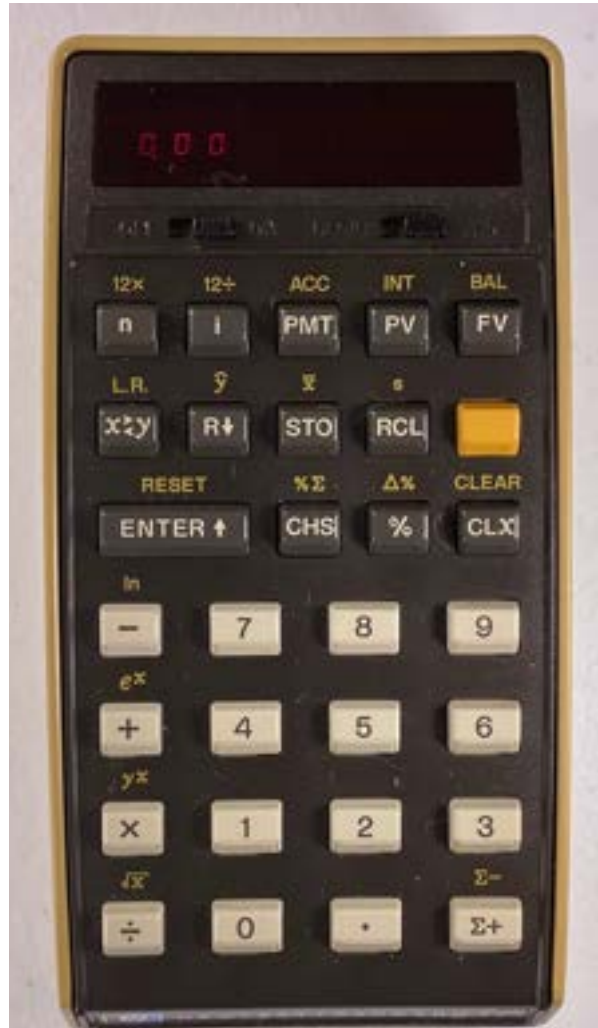


1994
HP-200LX
\$749
\$1,600

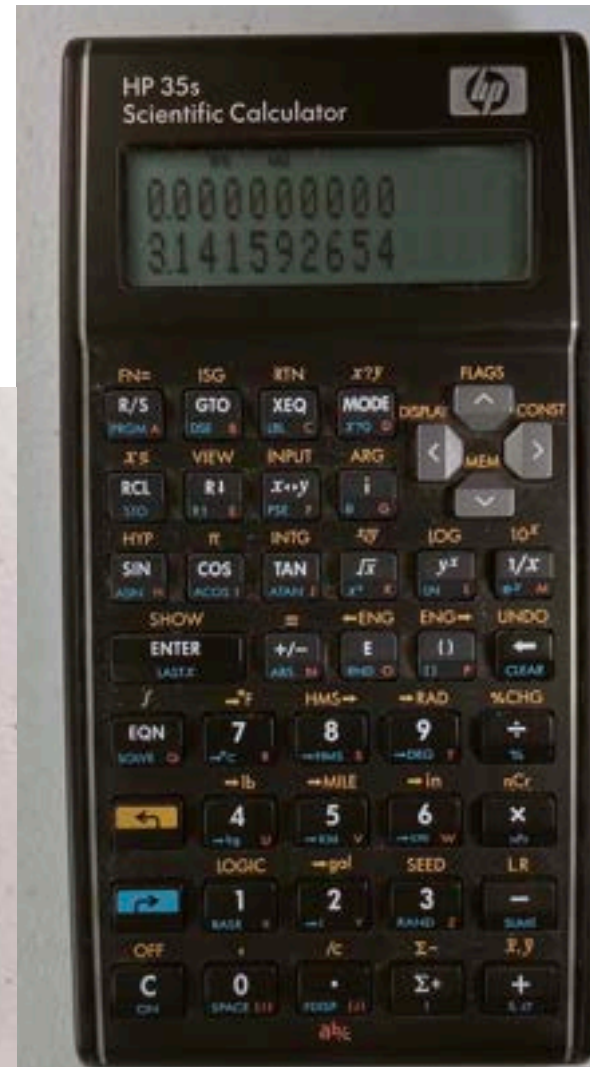
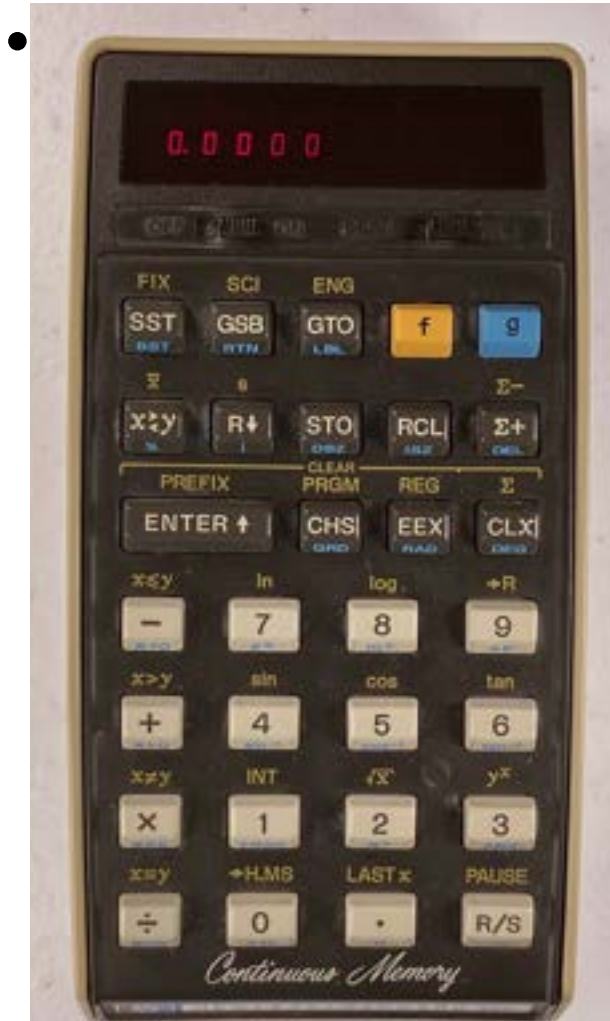


Windows

New Purchases: Financial (HP-22, HP-12C) and Retro (HP-35S) Calculators



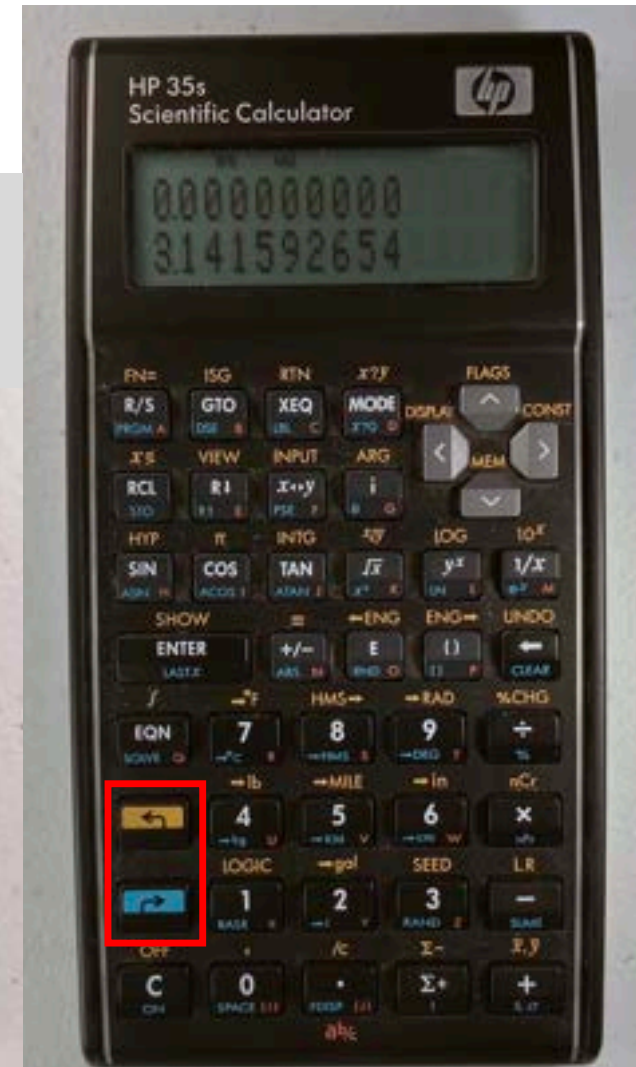
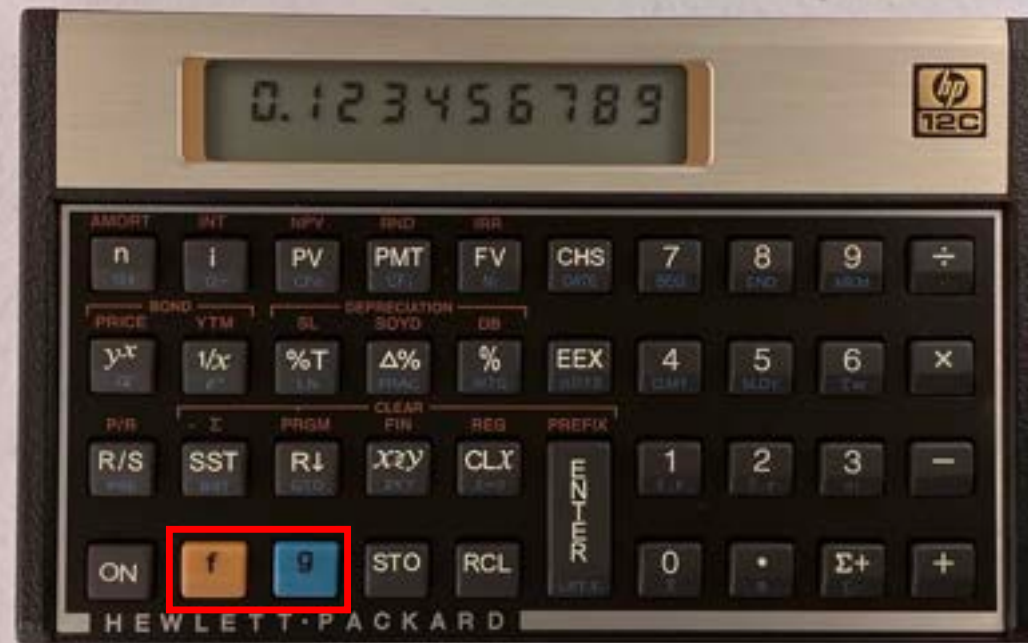
Accessibility Engineering for Color Blindness: Hewlett-Packard HP-29C, HP12C, HP35S



Accessibility Engineering for Color Blindness: Hewlett-Packard HP-29C, HP12C, HP35S



Hewlett-Packard commonly used
gold/blue alternate-function keys

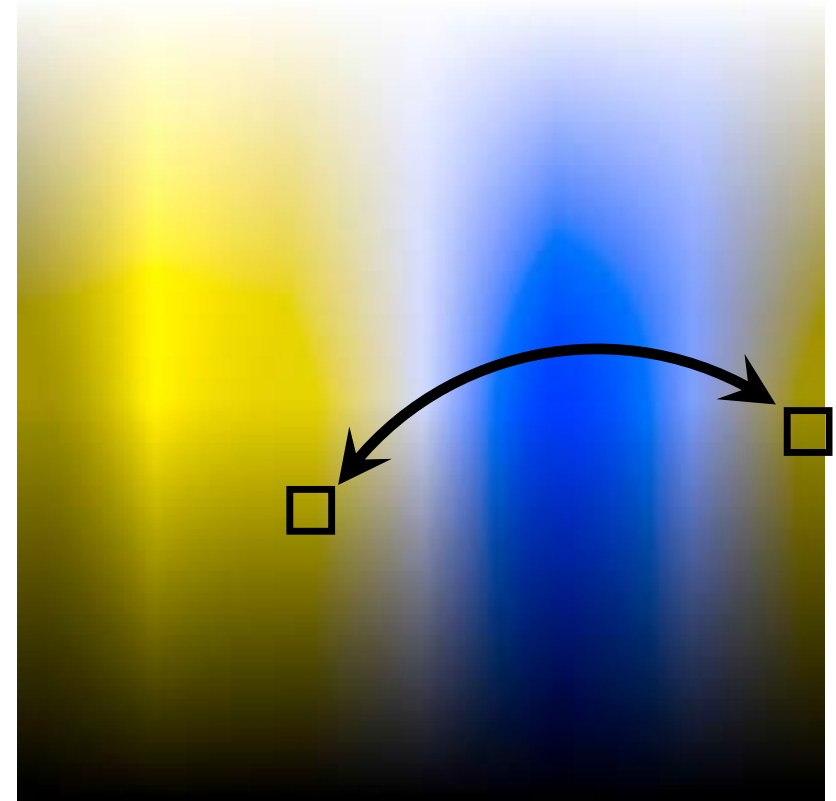
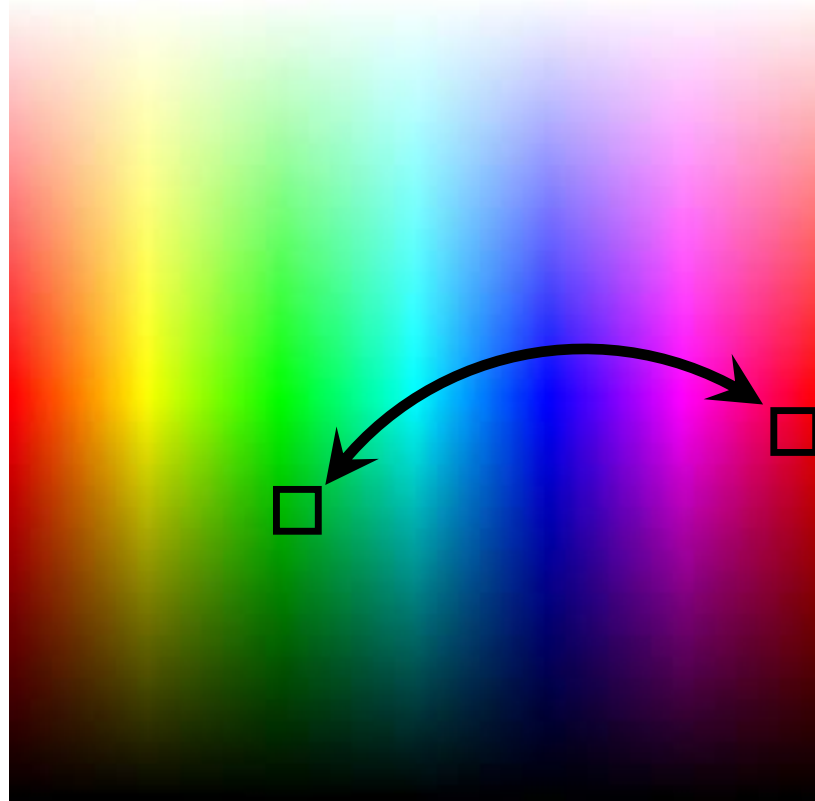


Accessibility Engineering for Color Blindness: Hewlett-Packard HP-29C, HP12C, HP35S

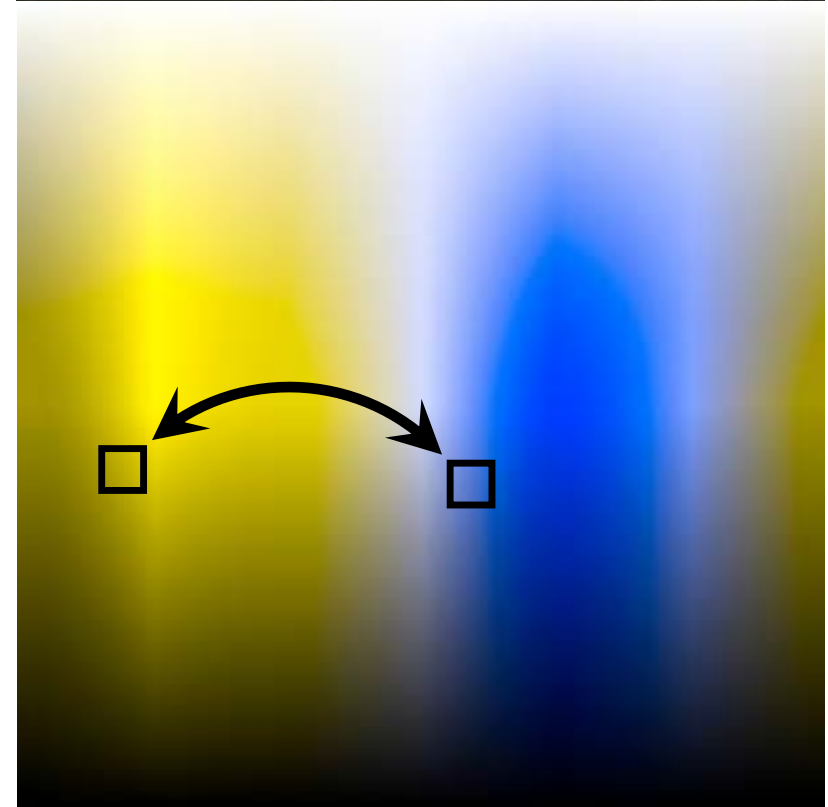
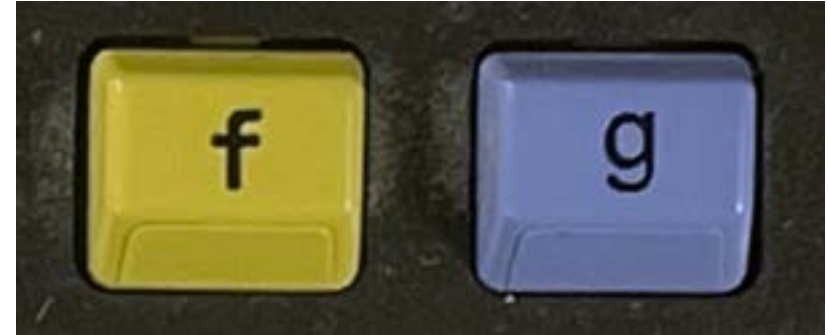
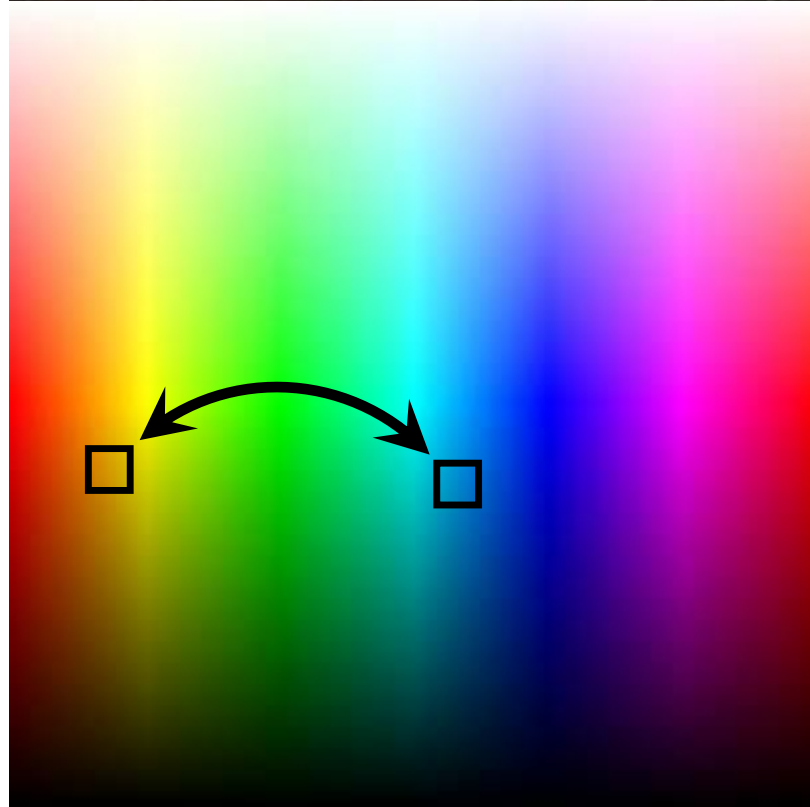
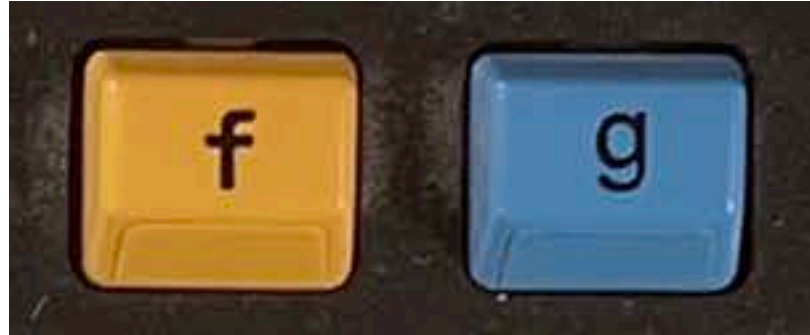
Simulating the Color Confusion of Red/Green Color Blindness

Different Colors as seen by
person with Normal Color Vision

Color Confusion as seen by
person with Deuteranopia



Accessibility Engineering for Color Blindness: Hewlett-Packard HP-29C, HP12C, HP35S



Calculators and the Future

- Students use specialized web-site based "calculators"
- Only use physical calculators during paper tests
- Highly capable calculators remain only a curiosity

Apparently "Vintage"
now means
"What I Once Used"

- Part 1: How Vintage Computing Devices Benefitted Me
- Part 2: The Amazing Curta!
- Part 3: Show and Tell

Kerry Veenstra, K3RRY

Part 2: The Amazing Curta!

- Designed by Curt Herzstark
 - Parents had an adding-machine company in Vienna
 - Herzstark was learning everything needed to take over the business
- WWII!
 - Herzstark already was working on the Curta design
 - SS kept him alive to finish the work and present the calculator to Hitler
 - "He might make you an honorary Aryan!"



Part 2: The Amazing Curta!

- War Ended
 - Franz Joseph II, Prince of Liechtenstein, provided funding for a factory



Part 2: The Amazing Curta!

- My Curta (no. 12440) was made in 1950

Jahr

No.

1947	901	-	3.000
1948	3.001	-	6.000
1949	6.001	-	9.200
1950	9.201	-	12.600
1951	12.601	-	16.600
1952	16.601	-	20.600
1953	20.601	-	24.400

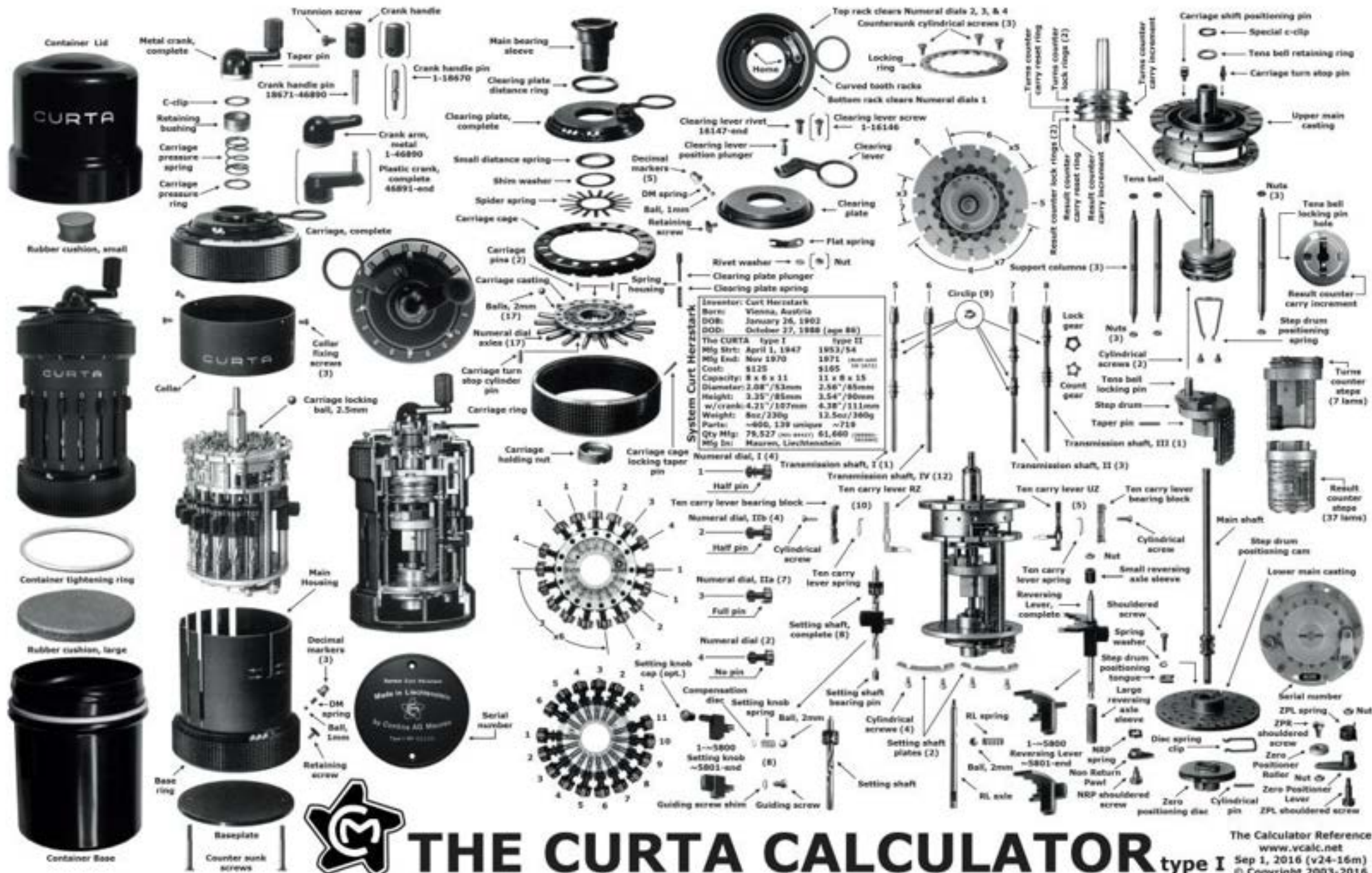
CURTA - RECHENMASCHINE

Modell I u. II

Baujahr mit laufender Nr.

CURTA - SERVICE

600
Parts!



THE CURTA CALCULATOR type I

The Calculator Reference
www.vcalc.net
Sep 1, 2016 (v24-16m)
© Copyright 2003-2016
Rick Furr

Demo

- Addition
- Subtraction *!*
- Multiplication *!!*
- Division *!!!*
- Square Roots *!!!!*

Addition

1. Enter a number using **side slides**
2. Sum into the **total on top** by turning the **crank** clockwise once (turn only clockwise)



Subtraction

1. Same as Addition
2. But lift the crank to enter subtraction mode
3. Lower crank to return to addition mode

Multiplication by 1 Digit n

1. To compute $x \times n$ add $x + x + x + x + \dots + x$, n times
 - Turn the crank n times

$$\begin{array}{r} 123 \\ * \quad 3 \\ \hline 369 \end{array}$$

Multiplication by n Digits

1. Add and **Shift**

$$\begin{array}{r} 8765 \\ * 1111 \\ \hline 8765 \\ 8765 \\ 8765 \\ 8765 \\ \hline 8765 \\ \hline 9737915 \end{array}$$



Division

1. Subtract and Shift
2. Use special "reverse" switch to count the number of subtractions positively

Square Root of x (5 significant digits)

1. Enter x
 2. Add nearest value from column 1 of table
 3. Multiply by value in column 2
- This method was used with traditional multiplying adding machines.

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now means
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