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10 ' *****
20 ' *** ***
30 ' *** APLICACIONES MATEMATICAS ***
40 ' *** ***
50 ' *** 1987 - V 7.2 ***
60 ' ***-----***
70 ' *** J.J. Valverde & S. Pumares ***
80 ' *** AMSTRAD USER ***
90 ' *****
100 '
110 '
120 MODE 1:INK 1,26:INK 0,0:INK 2,15:INK
  3,19,10:BORDER 0
130 MEMORY HIMEM-50:AD=HIMEM+1
140 FOR N=AD TO AD+49
150 READ A$:POKE N,VAL("&" + A$)
160 NEXT
170 DATA CD,06,B9,F5,3E,00,CD,A5,BB,DD,2
  1,32
180 DATA 90,06,08,7E,DD,77,00,DD,77,01,2
  3,DD,23,DD
190 DATA 23,10,F2,F1,CD,0C,B9,3E,FE,21,3
  2,90,CD
200 DATA A8,BB,3E,FF,21,3A,90,CD,A8,BB,C
  9
210 DATA 20,70,6F,72,20,4A,2E,4A,2E,56
220 DATA 61,6C,76,65,72,64,65,20,26,20
230 DATA 53,2E,20,50,75,6D,61,72,65,73
240 RESTORE 4090
250 FOR N=&A000 TO &A04A
260 READ A$:POKE N,VAL("&" + A$)
270 NEXT
280 GOTO 3910
290 ' *****
  **
300 ' *** RUTINA DE CARACTERES GIGANTES *
  **
310 ' *****
  **
320 FOR INDEX=1 TO LEN(X$)
330 POKE AD+5,ASC(MID$(X$,INDEX,1)):CA
  LL AD
340 PRINT CHR$(254);CHR$(10);CHR$(8);CHR
  $(255);CHR$(11);
350 NEXT
360 RETURN
370 ' *****
  *
380 ' *** ECUACIONES DE SEGUNDO GRADO **
  *
390 ' *****
  *
400 ON BREAK GOSUB 960:ON ERROR GOTO 890
410 C2=1:W=0:S0=0:PEN 2
420 MODE 1:X$="Introduzca los coeficient
  es de":LOCATE(40-LEN(X$))/2,2:GOSUB 320
430 X$="la ecuacion":LOCATE(40-LEN(X$))/
  2,4:GOSUB 320:PRINT:PRINT:PRINT:PRINT:PR
  INT:PEN 1
440 X$="Coeficiente en X":GOSUB 320:PRIN
  T CHR$(11);"2";CHR$(10);X$="? ":GOSUB 3
  20:GOSUB 520:A=VAL(V$):PRINT:PRINT:PRINT
  :PRINT
450 X$="Coeficiente en X ? ":GOSUB 320:G
  OSUB 520:B=VAL(V$):PRINT:PRINT:PRINT:PRI
  NT
460 X$="Coeficiente independiente ? ":GO
  SUB 320:GOSUB 520:C=VAL(V$):PRINT:PRINT:
  PRINT:PRINT:PRINT
470 X$="R repetir introduccion / ESPACIO
  operar":LOCATE(40-LEN(X$))/2,23:GOSUB 3
  20
480 WHILE INKEY$<>"":WEND
490 A$=INKEY$:IF A$="" THEN 490
500 IF UPPER$(A$)="R" THEN 420
510 IF UPPER$(A$)=" " THEN 660
520 PEN 3:V$=""
530 WHILE X$<>CHR$(13)
540 X$=INKEY$:IF X$="" THEN 540
550 IF (X$="." ) AND (LEN(V$)<5) THEN GOSUB 6
  20
560 IF (X$="-" ) AND (LEN(V$)=0) THEN GOSUB 3
  20:V$=V$+X$:GOTO 600
570 IF (X$=CHR$(127)) AND (LEN(V$)>0) THEN P
  RINT CHR$(8);CHR$(32);CHR$(8);CHR$(10);C
  HR$(32);CHR$(8);CHR$(11);V$=LEFT$(V$,LE
  N(V$)-1):GOTO 600
580 IF (X$<CHR$(48) OR X$>CHR$(57)) AND (X$<
  >CHR$(13)) THEN 540
590 IF (X$<>CHR$(13)) AND (LEN(V$)<5) THEN G
  OSUB 320:V$=V$+X$
600 WEND
610 PEN 1:RETURN
620 IF (V$="-" ) THEN V$="-0"
630 IF (V$="." ) THEN V$="0"
640 IF (VAL(V$)=INT(VAL(V$))) THEN GOSUB 3
  20:V$=V$+X$
650 RETURN
660 MODE 1:C2=1
670 IF A=0 THEN IF S0=1 THEN GOSUB 1480:

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GOTO 1090 ELSE 1040
680 D=B*B-4*A*C
690 IF D<0 THEN IF S0=1 THEN GOSUB 1480:
GOTO 1210 ELSE 1180
700 IF D>0 THEN IF S0=1 THEN GOSUB 1480:
GOTO 1140 ELSE 1110
710 IF S0=1 THEN GOSUB 1480:GOTO 740
720 X$="LA SOLUCION DE LA ECUACION:":LOC
ATE(40-LEN(X$))/2,2:GOSUB 320
730 GOSUB 1260:W=1
740 PEN 2:IF(S0=1)OR(A<>INT(A))OR(B<>INT
(B))OR(((B)/((2*A)))=INT((B)/((2*A))))THEN
S4=(-B)/((2*A)):X$=" ES "+CHR$(243)+" X =
"+STR$(S4)+" DOBLE":LOCATE(40-LEN(X$))/2
-1,15:GOSUB 320:GOTO 760
750 PEN 2:X$=" ES "+CHR$(243)+" X ="+STR
$((-B)+"/"+STR$(2*A)+" DOBLE":LOCATE(40-
LEN(X$))/2-1,15:GOSUB 320
760 INK 3,19,10:PEN 3:LOCATE 1,23:X$=" O
":GOSUB 320:PEN 1:X$="perar / ":GOSUB 32
0
770 PEN 3:X$="P":GOSUB 320:PEN 1:X$="rin
t / ":GOSUB 320
780 PEN 3:X$="C":GOSUB 320:PEN 1:X$="ont
inuar / ":GOSUB 320
790 PEN 3:X$="S":GOSUB 320:PEN 1:X$="ali
r":GOSUB 320
800 SOUND 1,100,15:INK 2,26
810 WHILE INKEY$<>"":WEND
820 A$=INKEY$:IF A$=" "THEN 820
830 IF(UPPER$(A$)="P")AND(C2=1)THEN 970
840 IF UPPER$(A$)="C"THEN INK 3,19:GOTO
400
850 IF UPPER$(A$)="S"THEN RUN
860 IF UPPER$(A$)="O"THEN IF S0=1 THEN S
0=0:GOSUB 1480:GOTO 670 ELSE S0=1:GOTO 6
70
870 IF UPPER$(A$)="Q"THEN INK 1,0:INK 0,
26:INK 3,0:INK 2,0:BORDER 26:;COPY
880 INK 1,26:INK 0,0:INK 3,19,10:INK 2,2
6:BORDER 0
890 GOTO 820
900 MODE 1:X$="EL VALOR DE LAS SOLUCIONE
S":LOCATE(40-LEN(X$))/2,5:GOSUB 320
910 X$="SOBREPASA EL MAXIMO PERMITIDO":L
OCATE(40-LEN(X$))/2,8:GOSUB 320
920 X$="POR LA MAQUINA":LOCATE(40-LEN(X$
))/2,11:GOSUB 320
930 X$="PULSE CUALQUIER TECLA PARA":LOCA
TE(40-LEN(X$))/2,14:GOSUB 320
940 X$="INTRODUCIR OTRA ECUACION":LOCATE
(40-LEN(X$))/2,17:GOSUB 320
950 WHILE INKEY$<>"":WEND:CALL &BB18:GOT
O 400
960 MODE 2:END
970 PRINT#8,"Las soluciones de la ecuaci
on :";W$
980 PRINT#8,"Son:"
990 IF W=0 THEN PRINT#8," X1=X2=";S4
;" UNICA por ser ecuacion de primer grad
o"
1000 IF W=1 THEN PRINT#8," X1=X2=";S
4
1010 IF W=2 THEN PRINT#8," X1=";R1:P
RINT#8," X2=";R2
1020 IF W=3 THEN PRINT#8," X1=";RE;"
+j";R1:PRINT#8," X2=";RE;"-j";R1
1030 GOTO 760
1040 X$="LA SOLUCION DE LA ECUACION:":LO
CATE(40-LEN(X$))/2,2:GOSUB 320
1050 GOSUB 1260:W=0
1060 IF B<>0 THEN S4=-C/B:GOTO 1090:C2=1
ELSE IF C=0 THEN 1080
1070 C2=0:MODE 1:X$="LA ECUACION NO PRES
ENTA SOLUCION":LOCATE((40-LEN(X$))/2),5:
GOSUB 320:GOTO 760
1080 C2=0:MODE 1:X$="LA ECUACION PRESENT
A INFINITAS SOLUCION":LOCATE((40-LEN(X$)
)/2),5:GOSUB 320:GOTO 760
1090 PEN 2:IF(S0=1)OR(C<>INT(C))OR(B<>IN
T(B))OR(S4=INT(S4))THEN X$=" ES "+CHR$(2
43)+" X ="+STR$(S4)+" UNICA":LOCATE(40-L
EN(X$))/2-1,15:GOSUB 320:GOTO 760
1100 X$=" ES "+CHR$(243)+" X ="+STR$(-C)
+" /"+STR$(B)+" UNICA":LOCATE(40-LEN(X$)
)/2-1,15:GOSUB 320:GOTO 760
1110 X$="LAS SOLUCIONES DE LA ECUACION:":
LOCATE(40-LEN(X$))/2,2:GOSUB 320
1120 GOSUB 1260:W=2:R1=((B)+SQR(D))/((2*
A)):R2=((B)-SQR(D))/((2*A))
1130 X$="SON:":LOCATE 7,12:GOSUB 320:M=M
AX(LEN(STR$(R1)),LEN(STR$(R2)))
1140 PEN 2:IF(S0=1)OR(A<>INT(A))OR(B<>IN
T(B))OR(C<>INT(C))OR((R1=INT(R1))AND(R2=
INT(R2)))THEN 1150 ELSE 1320
1150 X$=" X1 ="+STR$(R1):LOCATE(40-M)/2-
3,15:GOSUB 320
1160 X$=" X2 ="+STR$(R2):LOCATE(40-M)/2-
3,18:GOSUB 320
1170 GOTO 760

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1180 X$="LAS SOLUCIONES DE LA ECUACION: "
:LOCATE(40-LEN(X$))/2,2:GOSUB 320
1190 GOSUB 1260:W=3:RE=-B/(2*A):RI=SQR(-
D)/(2*A)
1200 X$="SON:":LOCATE 7,12:GOSUB 320
1210 PEN 2:IF(S0=1)OR(A<>INT(A))OR(B<>IN
T(B))OR(C<>INT(C))OR((RE=INT(RE))AND(RI=
INT(RI)))THEN 1230 ELSE 1320
1220 X$="SON:":LOCATE 7,12:GOSUB 320
1230 X$=" X1 =" +STR$(RE)+ " + j" +STR$(RI)
:LOCATE(40-LEN(X$))/2-2,15:GOSUB 320
1240 X$=" X2 =" +STR$(RE)+ " - j" +STR$(RI)
:LOCATE(40-LEN(X$))/2-2,18:GOSUB 320
1250 GOTO 760
1260 IF MID$(STR$(B),1,1)="-"THEN S1$="-
":H=-B ELSE S1$="":H=B
1270 IF MID$(STR$(C),1,1)="-"THEN S2$="-
":HC=-C ELSE S2$="":HC=C
1280 S=LEN(STR$(A)+ " X2" +S1$+STR$(H)+ " X
"+S2$+STR$(HC)+ " = 0")
1290 W$=STR$(A)+ " X^2 " +S1$+STR$(H)+ " X
"+S2$+STR$(HC)+ " = 0"
1300 LOCATE((40-S)/2),8:X$=STR$(A)+ " X":
GOSUB 320:PRINT CHR$(11); "2";CHR$(10);:X
$=S1$+STR$(H)+ " X " +S2$+STR$(HC)+ " = 0"
:GOSUB 320
1310 RETURN
1320 INK 2,0:PEN 2:IF W=3 THEN D=-D
1330 IF A<0 THEN A=-A:B=-B:C=-C:S3=1 ELS
E S3=0
1340 IF((SQR(D)-INT(SQR(D)))>0.0001)THEN
R=1:C0=1 ELSE R=0:IF(((SQR(D)/(2*A))-(I
NT(SQR(D)/(2*A))))>0.0001)THEN C0=1 ELSE
C0=0
1350 IF((-B/(2*A))<>INT((-B/(2*A))))THEN
C1=1 ELSE C1=0
1360 IF C1=1 THEN X1$=STR$(-B)+ "/" +STR$(
2*A)ELSE X1$=STR$(-B/(2*A))
1370 IF C0=1 THEN IF R=1 THEN X2$=" " +ST
R$(D)+ "/" +STR$(2*A)ELSE X2$=STR$(SQR(D))
+ "/" +STR$(2*A)ELSE X2$=STR$((SQR(D)/(2*A
)))
1380 IF W=2 THEN X$="X1=" +X1$+ " + " +X2$:LO
CATE(40-LEN(X$))/2,15:GOSUB 320:P=0:GOSU
B 1400:X$="X2=" +X1$+ " - " +X2$:LOCATE(40-LE
N(X$))/2,18:GOSUB 320:P=6:GOSUB 1400:GOT
O 760
1390 IF W=3 THEN X$="X1=" +X1$+ " +j" +X2$:
LOCATE(40-LEN(X$))/2,15:GOSUB 320:P=0:GO
SUB 1400:X$="X2=" +X1$+ " -j" +X2$:LOCATE(4
0-LEN(X$))/2,18:GOSUB 320:P=6:GOSUB 1400
:GOTO 760
1400 IF R=0 THEN RETURN
1410 E=15*(41-((LEN(X2$))+((40-LEN(X$))/
2)))
1420 E0=8*(21-P)+13
1430 FOR I=0 TO 3
1440 PLOT E+I,E0,2:DRAW 9,-35,2:DRAW 9
,35+I,2:DRAW(15*LEN(STR$(D)))-I,0,2
1450 NEXT
1460 IF S3=1 THEN A=-A:B=-B:C=-C
1470 RETURN
1480 INK 2,0:FOR I=1 TO 40:LOCATE I,14:P
RINT " ";CHR$(8);CHR$(10); " ";CHR$(8);CHR
$(10); " ";CHR$(8);CHR$(10); " ";CHR$(8);C
HR$(10); " ";CHR$(8);CHR$(10); " ":NEXT:RE
TURN
1490 '*****
1500 '*** DETERMINANTES ***
1510 '*****
1520 MODE 1:ON BREAK GOSUB 2270:ON ERROR
GOTO 2210
1530 PEN 2:LOCATE 2,2:X$="Orden del dete
rminante(de 2 hasta 6)":GOSUB 320
1540 PEN 1:LOCATE 15,7:INPUT BX
1550 IF BX<2 OR BX>6 THEN LOCATE 16,7:PR
INT " ":GOTO 1530
1560 DIM M(BX^2),Z(BX^2),F(BX^2):DX=0:GX
=BX:PEN 2
1570 MODE 1:LOCATE 2,2:X$="Introduce los
numeros del determinante":GOSUB 320:X$=
" por filas":LOCATE(40-LEN(X$))/2,5:GOSU
B 320:PRINT:PRINT:PRINT
1580 FOR AX=1 TO BX
1590 FOR CX=1 TO BX
1600 DX=DX+1
1610 PEN 1:X$="a(" +STR$(AX)+ " , " +STR$(CX)
+ " )=" :GOSUB 320
1620 PEN 3:V$=" "
1630 WHILE X$<>CHR$(13)
1640 X$=INKEY$:IF X$=" "THEN 1640
1650 IF(X$="-")AND(LEN(V$)=0)THEN GOSUB
320:V$=V$+X$:GOTO 1690
1660 IF(X$=CHR$(127))AND(LEN(V$)>0)THEN
PRINT CHR$(8);CHR$(32);CHR$(8);CHR$(10);
CHR$(32);CHR$(8);CHR$(11);:V$=LEFT$(V$,L
EN(V$)-1):GOTO 1690
1670 IF(X$<CHR$(48)OR X$>CHR$(57))AND(X$
<>CHR$(13))THEN 1640
1680 IF(X$<>CHR$(13))AND(LEN(V$)<5)THEN

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GOSUB 320:V$=V$+X$
1690 WEND
1700 M(DX)=VAL(V$):Z(DX)=M(DX):PRINT:PRINT:PRINT
1710 NEXT CX
1720 NEXT AX:PEN 1:CX=1:F=1
1730 IF Z(1)=0 THEN E=1:GOTO 1750
1740 E=(1/Z(1))^(BX-2)
1750 F=F*E
1760 IF BX=2 THEN F=F*(Z(1)*Z(4)-Z(2)*Z(3)):GOTO 1860
1770 CX=1
1780 FOR DX=0 TO BX^2-BX*2 STEP BX-1
1790 CX=CX+BX
1800 FOR AX=1 TO BX-1
1810 F(AX+DX)=Z(1)*Z(AX+CX)-Z(CX)*Z(AX+1)
1820 NEXT AX:NEXT DX
1830 BX=BX-1
1840 FOR AX=1 TO BX^2:Z(AX)=F(AX):NEXT AX
1850 GOTO 1730
1860 MODE 1:DX=0:X$="DETERMINANTE de ORDEN "+STR$(GX):LOCATE(40-LEN(X$))/2,1:GOSUB 320
1870 FOR AX=1 TO 2*GXSTEP 2
1880 FOR CX=1 TO 6*GXSTEP 6
1890 DX=DX+1
1900 LOCATE 1+CX,(3+(18-2*GX)/2)+AX:PRINT:USING"#####";M(DX);
1910 NEXT CX
1920 PRINT" ";CHR$(10);CHR$(8);"!":GOSUB 1980
1930 NEXT AX
1940 X$=" Resultado =" +STR$(F)
1950 IF(6*GX+3+LEN(X$))>=40 THEN C0X=0 ELSE C0X=1
1960 IF C0X=1 THEN LOCATE 6*GX+3,12:GOSUB 320:GOTO 1990
1970 IF C0X=0 THEN LOCATE 1,20:X$="Resultado =" +STR$(F):GOSUB 320:GOTO 1990
1980 LOCATE 1,(3+(18-2*GX)/2)+AX:PRINT":CHR$(10);CHR$(8);!":RETURN
1990 INK 3,19,10:PEN 3:LOCATE 4,23:X$="P":GOSUB 320:PEN 1:X$="rinter / ":GOSUB 320
2000 PEN 3:X$="C":GOSUB 320:PEN 1:X$="continuar / ":GOSUB 320
2010 PEN 3:X$="S":GOSUB 320:PEN 1:X$="al ir":GOSUB 320
2020 WHILE INKEY$<>"":WEND
2030 A$=INKEY$:IF A$="" THEN 2030
2040 IF UPPER$(A$)="P" THEN 2100
2050 IF UPPER$(A$)="C" THEN:ERASE M,Z,F:INK 3,19:GOTO 1520
2060 IF UPPER$(A$)="S" THEN RUN
2070 IF UPPER$(A$)="Q" THEN INK 1,0:INK 0,26:INK 3,0:INK 2,0:BORDER 26:;COPY
2080 INK 1,26:INK 0,0:INK 3,19,10:INK 2,26:BORDER 0
2090 GOTO 2030
2100 PRINT#8,"Determinante de orden";GX:PRINT#8
2110 DX=0:FOR AX=1 TO GX
2120 PRINT#8,"! ";
2130 FOR CX=1 TO GX
2140 DX=DX+1
2150 PRINT#8,USING"#####";M(DX);
2160 NEXT CX
2170 PRINT#8,"! ";IF AX=INT(GX/2)+1 THEN PRINT#8," = ";F;
2180 PRINT#8
2190 NEXT AX
2200 GOTO 1990

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2210 MODE 1:X$="EL VALOR DEL DETERMINANT
E":LOCATE(40-LEN(X$))/2,5:GOSUB 320
2220 X$="SOBREPASA EL MAXIMO PERMITIDO":
LOCATE(40-LEN(X$))/2,8:GOSUB 320
2230 X$="POR LA MAQUINA":LOCATE(40-LEN(X
$))/2,11:GOSUB 320
2240 X$="PULSE CUALQUIER TECLA PARA":LOC
ATE(40-LEN(X$))/2,14:GOSUB 320
2250 X$="INTRODUCIR OTRO DETERMINANTE":L
OCATE(40-LEN(X$))/2,17:GOSUB 320
2260 WHILE INKEY$<>"":WEND:CALL &BB18:ER
ASE M,Z,F:GOTO 1520
2270 MODE 2:END
2280 ' *****
2290 ' ** APROXIMACION DE FUNCIONES **
2300 ' *****
2310 ON BREAK GOSUB 3870:INK 1,26:INK 2,
26:INK 3,19:PEN 3:ON ERROR GOTO 3820
2320 DIM CX(50),CY(50)
2330 MODE 1:A=0:B=0:C=0:X=0:Y=0:P=0:T=0:
U=0:V=0:W=0:S=0:Z=0:Y=0:Q=0:R=0:F=0:N=0
2340 X$="">> APROXIMACION DE FUNCIONES <<
":LOCATE(40-LEN(X$))/2,2:GOSUB 320
2350 X$="=====
":LOCATE(40-LEN(X$))/2,4:GOSUB 320
2360 P=1:PEN 1:X$="INTRODUCE LOS PARES D
E VALORES X-Y.":LOCATE 2,8:GOSUB 320
2370 X$="Teclea F para finalizar":LOCATE
2,23:GOSUB 320
2380 X$="PAR NUMERO: ":LOCATE 2,12:GOSUB
320:ESP=0:FIN=-1:SALIR=0:INK 2,26
2390 PEN 3:X$=STR$(N+1):LOCATE 15,12:GOS
UB 320:PEN 2
2400 X$="X("+STR$(N+1)+")= ":LOCATE 5,16
:GOSUB 320:GOSUB 2450:X=VAL(V$):FIN=0
2410 IF SALIR THEN 2640 ELSE CX(N)=X
2420 X$="Y("+STR$(N+1)+")= ":LOCATE 5,19
:GOSUB 320:GOSUB 2450:Y=VAL(V$):CY(N)=Y:
N=N+1:FIN=-1
2430 GOSUB 2590
2440 GOTO 2630
2450 V$="":X$="1":WHILE X$<>CHR$(13)
2460 X$=INKEY$:IF X$=""THEN 2460
2470 IF ESP=1 AND(X$=CHR$(240)OR X$=CHR$(
241))AND LEN(V$)=0 THEN GOSUB 3440
2480 IF(UPPER$(X$)="F")AND(LEN(V$)=0)AND
FIN AND(N>1)THEN X$="F":GOSUB 320:SALIR
=-1:V$=""
2490 IF(X$=".")AND(LEN(V$)<5)THEN GOSUB
2560
2500 IF(X$=CHR$(127))AND(LEN(V$)>0)THEN
PRINT CHR$(8);CHR$(32);CHR$(8);CHR$(10);
CHR$(32);CHR$(8);CHR$(11);:V$=LEFT$(V$,L
EN(V$)-1):SALIR=0:GOTO 2530
2510 IF(X$<CHR$(48)OR X$>CHR$(57))AND(X$
<>CHR$(13))THEN 2460
2520 IF(X$<>CHR$(13))AND(LEN(V$)<5)THEN
GOSUB 320:V$=V$+X$
2530 WEND
2540 IF VAL(V$)<>0 OR SALIR THEN RETURN
ELSE IF LEN(V$)<>0 THEN X$="":FOR
INDICEX=0 TO LEN(V$):PRINT CHR$(8);:NEXT
:GOSUB 320:FOR INDICEX=0 TO LEN(X$)-2:PR
INT CHR$(8);:NEXT
2550 GOTO 2450
2560 IF(V$=".")THEN V$=""
2570 IF(VAL(V$)=INT(VAL(V$)))THEN GOSUB
320:V$=V$+X$
2580 RETURN
2590 RETURN
2600 Y=LOG(Y):RETURN
2610 X=LOG(X):RETURN
2620 X=LOG(X):GOTO 2600
2630 T=T+X:U=U+Y:V=V+X*Y:W=W+X*X:Z=Z+Y*Y
:INK 2,0:FOR INDICEX=1 TO 5:LOCATE 1,15+
INDICEX:PRINT SPACE$(60):NEXT:INK 2,26:G
OTO 2390
2640 S=T/N:B=(V-S*U)/(W-S*T):A=(U-B*T)/N
:C=A:Q=U*U/N:R=(C*U+B*V-Q)/(Z-Q)
2650 APROX=ABS(R):A$="1":FOR P=2 TO 4
2660 A=0:B=0:C=0:X=0:Y=0:T=0:U=0:V=0:W=0
:S=0:Z=0:Y=0:Q=0:R=0:F=0
2670 FOR INDICEX=0 TO N-1
2680 X=CX(INDICEX):Y=CY(INDICEX)
2690 ON P GOSUB 2590,2600,2610,2620
2700 T=T+X:U=U+Y:V=V+X*Y:W=W+X*X:Z=Z+Y*Y
2710 NEXT:S=T/N:B=(V-S*U)/(W-S*T):A=(U-B
*T)/N:C=A
2720 IF P=2 OR P=4 THEN A=EXP(1)^C:Q=U*U
/N:R=(C*U+B*V-Q)/(Z-Q)
2730 IF ABS(R)>APROX THEN A$=STR$(P)
2740 NEXT:GOTO 3010
2750 S=T/N:B=(V-S*U)/(W-S*T):A=(U-B*T)/N
:C=A
2760 INK 1,26:INK 2,15:PEN 1:MODE 1:X$="
La funcion ha sido aproximada a una":LOC
ATE 3,1:GOSUB 320:X$="curva del tipo:":L
OCATE(40-LEN(X$))/2,4:GOSUB 320
2770 PEN 2:ON P GOSUB 2790,2800,2810,282
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2780 PEN 1:GOTO 2840
2790 X$="Y = A + BX":LOCATE(40-LEN(X$))/
2,7:GOSUB 320:RETURN
2800 X$="Y = A exp[BX]":LOCATE(40-LEN(X$
))/2,7:GOSUB 320:GOTO 2830
2810 X$="Y = A + B Ln(X)":LOCATE(40-LEN(
X$))/2,7:GOSUB 320:RETURN
2820 X$="Y = A X":LOCATE(40-LEN(X$))/2,7
:GOSUB 320:PRINT CHR$(11);"B"
2830 A=EXP(1)^C:RETURN
2840 Q=U*U/N:R=(C*U+B*V-Q)/(Z-Q)
2850 LOCATE 1,10:X$="El coeficiente ":GO
SUB 320:PEN 2:X$="A":GOSUB 320:PEN 1:X$=
" es igual a: ":GOSUB 320
2860 PEN 2:X$=STR$(ROUND(A,3)):GOSUB 320
:PEN 1
2870 LOCATE 1,13:X$="El coeficiente ":GO
SUB 320:PEN 2:X$="B":GOSUB 320:PEN 1:X$=
" es igual a: ":GOSUB 320
2880 PEN 2:X$=STR$(ROUND(B,3)):GOSUB 320
:PEN 1
2890 LOCATE 1,16:X$="El termino de ajust
e ":GOSUB 320:PEN 2:X$="C":GOSUB 320:PE
N 1:X$=" es: ":GOSUB 320
2900 PEN 2:X$=STR$(ROUND(R,3)):GOSUB 320
:PEN 1
2910 INK 3,19,10:PEN 3:LOCATE 1,20:X$="
C":GOSUB 320:PEN 1:X$="alculos / ":GOSUB
320:PEN 3:X$=" G":GOSUB 320:PEN 1:X$="r
afica / ":GOSUB 320:PEN 3:X$=" P":GOSUB
320:PEN 1:X$="rinter / ":GOSUB 320:PEN 3:
X$=" S":GOSUB 320:PEN 1:X$="alir":GOSUB
320
2920 PEN 3:LOCATE 1,23:X$=" 1":GOSUB 320
:PEN 1:X$="-Lin. / ":GOSUB 320:PEN 3:X
$=" 2":GOSUB 320:PEN 1:X$="-Exp. / ":GO
SUB 320:PEN 3:X$=" 3":GOSUB 320:PEN 1:X$
="-Log. / ":GOSUB 320:PEN 3:X$=" 4":GOSU
B 320:PEN 1:X$="-Pot.":GOSUB 320
2930 WHILE INKEY$<>"":WEND
2940 A$=INKEY$:IF A$=""THEN 2940
2950 IF UPPER$(A$)="S"THEN RUN
2960 IF UPPER$(A$)="P"THEN 3070
2970 IF UPPER$(A$)="C"THEN 3180
2980 IF UPPER$(A$)="G"THEN 3470
2990 IF A$="1"OR A$="2"OR A$="3"OR A$="4
"THEN IF P<>VAL(A$)THEN 3010
3000 GOTO 2940
3010 A=0:B=0:C=0:X=0:Y=0:P=0:T=0:U=0:V=0
:W=0:S=0:Z=0:Y=0:Q=0:R=0:F=0:P=VAL(A$)
3020 FOR INDICEX=0 TO N-1
3030 X=CX(INDICEX):Y=CY(INDICEX)
3040 ON P GOSUB 2590,2600,2610,2620
3050 T=T+X:U=U+Y:V=V+X*Y:W=W+X*X:Z=Z+Y*Y
3060 NEXT:GOTO 2750
3070 PRINT#8,"Los valores dados han sido
aproximados a una curva del tipo: ";
3080 ON P GOSUB 3140,3150,3160,3170
3090 PRINT#8,X$:PRINT#8,"Donde : "
3100 PRINT#8,"El coeficiente A es igual
a: ";A
3110 PRINT#8,"El coeficiente B es igual
a: ";B
3120 PRINT#8,"El coeficiente de correlac
ion C es igual a: ";R
3130 GOTO 2940
3140 X$="Y = A + BX":RETURN
3150 X$="Y = A exp[BX]":RETURN
3160 X$="Y = A + B Ln(X)":RETURN
3170 X$="Y = A X^B":RETURN
3180 INK 2,26:INK 3,19:PEN 3:MODE 1:X$="
CALCULO APROXIMADO DE COORDENADAS":LOCAT
E(40-LEN(X$))/2,1:GOSUB 320
3190 X$=STRING$(39,"="):LOCATE 1,3:GOSUB
320
3200 PEN 1:X$="Introduce el valor a apro
ximar ":LOCATE 2,7:GOSUB 320
3210 X$="Teclea F para salir. "+CHR$(34)
+CHR$(240)+CHR$(34)+"-X. "+CHR$(34)+CHR$
(241)+CHR$(34)+"-Y.":LOCATE 2,23:GOSUB 3
20:SALIR=0
3220 PEN 2:X$="-> X= ":LOCATE 2,11:GOSU
B 320
3230 X$=" Y= ":LOCATE 2,14:GOSUB 320
3240 FIN=-1:ESP=1:EQ=1:LOCATE 9,11:GOSUB
2450
3250 IF SALIR THEN 2750 ELSE F=VAL(V$)
3260 IF EQ=1 THEN ON P GOSUB 3350,3360,3
380,3390
3270 IF EQ=2 THEN ON P GOSUB 3400,3410,3
420,3430
3280 IF EQ=1 THEN LOCATE 8,14 ELSE LOCAT
E 8,11
3290 X$=STR$(ROUND(G,3)):GOSUB 320
3300 X$="*> Pulsa una tecla para seguir"
:LOCATE 2,18:GOSUB 320
3310 WHILE INKEY$<>"":WEND
3320 a$=INKEY$:IF a$=""THEN 3320
3330 INK 2,0:FOR INDICEX=0 TO 10:LOCATE
1.11+INDICEX:PRINT SPACE$(60):NEXT:INK 2

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,26
3340 GOTO 3220
3350 G=A+B*F:RETURN
3360 E=EXP(1)
3370 G=E^(B*F):G=A*G:RETURN
3380 G=A+B*LOG(F):RETURN
3390 G=A*F^B:RETURN
3400 G=(F-A)/B:RETURN
3410 G=(LOG(F/A))/B:RETURN
3420 E=EXP(1):G=E^((F-A)/B):RETURN
3430 G=(F/A)^(1/B):RETURN
3440 IF(EQ=2 AND X$=CHR$(241))OR(EQ=1 AND
X$=CHR$(240))THEN RETURN
3450 IF EQ=1 AND X$=CHR$(241)THEN LOCATE
2,11:X$=" ":GOSUB 320:LOCATE 2,14:X$="
->":GOSUB 320:LOCATE 9,14:EQ=2:RETURN
3460 IF EQ=2 AND X$=CHR$(240)THEN LOCATE
2,14:X$=" ":GOSUB 320:LOCATE 2,11:X$="
->":GOSUB 320:LOCATE 9,11:EQ=1:RETURN
3470 MODE 2:INK 1,26:INK 0,0:BORDER 0:PE
N 1
3480 MAXIMOX=CX(0):MAXIMOY=CY(0):MINIMOX
=CX(0):MINIMOY=CY(0)
3490 FOR INDEX=1 TO N-1:IF MAXIMOX<CX(
INDEX)THEN MAXIMOX=CX(INDEX)ELSE MIN
IMOX=CX(INDEX)
3500 IF MAXIMOY<CY(INDEX)THEN MAXIMOY=
CY(INDEX)ELSE MINIMOY=CY(INDEX)
3510 NEXT
3520 FOR INDEX=1 TO 2:PLOT 8+INDEX,3
99,1:DRAW 8+INDEX,8+INDEX:DRAW 639,8
+INDEX:NEXT
3530 FOR INDEX=8 TO 392 STEP 16:PLOT 1
,INDEX:DRAW 8,INDEX:NEXT
3540 FOR INDEX=8 TO 632 STEP 16:PLOT I
NDICE,1:DRAW INDICE,8:NEXT
3550 GOSUB 3610
3560 FOR INDEX=0 TO N-1:CORX=((625*CX(
INDEX))/MAXIMOX)+10:CORY=((385*CY(INDI
CE))/MAXIMOY)+10
3570 FOR INDEX=-4 TO 4:PLOT CORX+INDI
CE,CORY+INDEX:NEXT
3580 FOR INDEX=-4 TO 4:PLOT CORX-INDI
CE,CORY+INDEX:NEXT
3590 NEXT
3600 GOTO 3660
3610 ON P GOSUB 3750,3760,3770,3780
3620 LOCATE((78-LEN(X$))/2,23:GOSUB 320
:IF P=4 THEN PRINT"B"
3630 LOCATE 73,23:X$="Eje X":GOSUB 320
3640 LOCATE 4,1:X$="Eje Y":GOSUB 320
3650 RETURN
3660 INDICADOR=1:PRINT CHR$(21);
3670 FOR INDEX=1E-38 TO(MAXIMOX+0.5)ST
EP((MAXIMOX-MINIMOX)/N)
3680 LOCATE 30,1
3690 F=INDEX:ON P GOSUB 3350,3360,3380
,3390
3700 CORX=625*F/MAXIMOX+10:CORY=385*G/MA
XIMOY+10
3710 IF CORX>1000 OR CORY>1000 THEN 3730
3720 IF INDICADOR=1 THEN PLOT CORX,CORY:
INDICADOR=0 ELSE DRAW CORX,CORY
3730 NEXT:PRINT CHR$(6);
3740 GOTO 3790
3750 X$="Y = A + BX":RETURN
3760 X$="Y = A exp[BX]":RETURN
3770 X$="Y = A + B Ln(X)":RETURN
3780 X$="Y = A X":RETURN

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3790 SOUND 1,100,30,15:WHILE INKEY$<>"":
WEND
3800 A$=INKEY$:IF A$=""THEN 3800
3810 GOTO 2750
3820 MODE 1:X$="ERROR EN EL PROCESO":LOC
ATE(40-LEN(X$))/2,7:GOSUB 320
3830 X$="EL PROGRAMA SERA REINICIALIZADO
":LOCATE(40-LEN(X$))/2,10:GOSUB 320
3840 X$="PULSE CUALQUIER TECLA":LOCATE(4
0-LEN(X$))/2,13:GOSUB 320
3850 WHILE INKEY$<>"":WEND
3860 A$=INKEY$:IF A$=""THEN 3860 ELSE RU
N
3870 MODE 2:END
3880 : *****
3890 ' ** MENU PRINCIPAL **
3900 ' *****
3910 PEN 2:X$=" >>> APLICACIONES MATEMAT
ICAS <<< ":LOCATE(40-LEN(X$))/2,3:GOSUB
320
3920 X$="=====
==":LOCATE(40-LEN(X$))/2,5:GOSUB 320
3930 RESTORE 210:PEN 2:LOCATE 5,8:FOR IN
DICEX=1 TO 4:READ A$:PRINT CHR$(VAL("&"+
A$)):SOUND 1,100,1,15:FOR AX=1 TO 100:N
EXT AX,INDICEX
3940 PEN 3:FOR INDICEX=1 TO 14:READ A$:P
RINT CHR$(VAL("&"+A$)):SOUND 1,100,1,15
:FOR AX=1 TO 100:NEXT AX,INDICEX
3950 PEN 2:READ A$:PRINT CHR$(VAL("&"+A$
)):SOUND 1,100,1,15:FOR AX=1 TO 100:NEX
T
3960 PEN 3:FOR INDICEX=1 TO 11:READ A$:P
RINT CHR$(VAL("&"+A$)):SOUND 1,100,1,15
:FOR AX=1 TO 100:NEXT AX,INDICEX
3970 PEN 3:X$=" 1":LOCATE 3,11:GOSUB 320
:PEN 1:X$="....ECUACIONES DE SEGUNDO GRA
DO":LOCATE 5,11:GOSUB 320
3980 PEN 3:X$=" 2":LOCATE 3,15:GOSUB 320
:PEN 1:X$="....DETERMINANTES DE ORDEN 6
MAXIMO":LOCATE 5,15:GOSUB 320
3990 PEN 3:X$=" 3":LOCATE 3,19:GOSUB 320
:PEN 1:X$="....APROXIMACION DE FUNCIONES
":LOCATE 5,19:GOSUB 320
4000 X$="Elija la opcion deseada (1-3)":
LOCATE 2,24:GOSUB 320
4010 SOUND 1,100,20,15:WHILE INKEY$<>"":
WEND
4020 CALL &A000
4030 TECLA=PEEK(&A049):IF TECLA<49 OR TE
CLA>52 THEN SOUND 1,300,10,15:GOTO 4020
ELSE A$=CHR$(TECLA):SOUND 1,200,10,15
4040 IF A$="1"THEN 400
4050 IF A$="2"THEN 1520
4060 IF A$="3"THEN 2310
4070 IF A$="4"THEN MODE 2:PEN 1:CALL &BC
02:END
4080 GOTO 4020
4090 DATA 06,08,11,4A,A0,21,38,C2
4100 DATA 7E,12,3E,08,84,67,13,10
4110 DATA F7,21,39,C2,11,38,C2,06
4120 DATA 08,C5,E5,D5,01,3C,00,ED
4130 DATA B0,D1,E1,3E,08,84,67,57
4140 DATA C1,10,EE,CD,19,BD,06,08
4150 DATA 21,74,C2,11,4A,A0,1A,77
4160 DATA 3E,08,84,67,13,10,F7,CD
4170 DATA 1B,BB,D2,00,A0,32,49,A0
4180 DATA C9,00,00

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