CHAPTER 0 Calculator Notes for the fx-9750G Plus and CFX-9850GC Plus

To display the Main Menu screen of this calculator while in any mode, press MENU. If the Main Menu screen is not immediately displayed, press EXIT MENU or AC/ON MENU. There are 15 modes that can be accessed from the Main Menu screen. To access a mode, use the arrow keys to move the highlighting to the icon you want, and press EXE to display the first screen of the mode you selected. You can also enter a mode without highlighting an icon in the Main Menu by inputting the number or letter marked in the lower-right corner of the icon.

Many of the operations performed by this calculator can be executed by pressing function keys F1 through F6. The operation assigned to each function key changes according to the mode. Function menus are at the bottom of the display in each mode.

Note 0A • Fractions

This calculator has two special keys to facilitate work with fractions. From the Main Menu, select RUN and press EXE. To ensure that your calculator has the correct settings, press SHIFT [SET UP] to display the setup screen. Highlight Mode and press F1 to select the Computation mode. Arrow down to highlight Display and press F3 to select exponential display range Norm1 or Norm2. (See **Note 1J** for an explanation of the setup options.) Press EXE to return to RUN mode.

a. a^b/c is used to enter a number as a fraction or as a mixed number. Fractional values are displayed with the integer first, followed by the numerator, then the denominator. To enter $\frac{3}{4}$, press 3 a^b/c 4 EXE. To enter $3\frac{1}{2}$, press 3 a^b/c 1 a^b/c 2 EXE. Fractions are automatically displayed in reduced form.
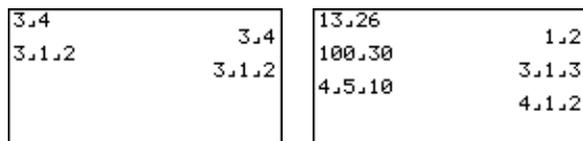
b. F↔D converts fractions to decimal numbers and vice versa. A nonrepeating decimal number that has a fraction equivalent with no more than ten characters (including integer, numerator, denominator) and delimiter marks will convert. F↔D also is used to send images to a computer, so if it does not seem to work, select LINK from the Main Menu and press EXE. Then press F6 (IMGE) followed by F1 (Off) to turn the link feature off.
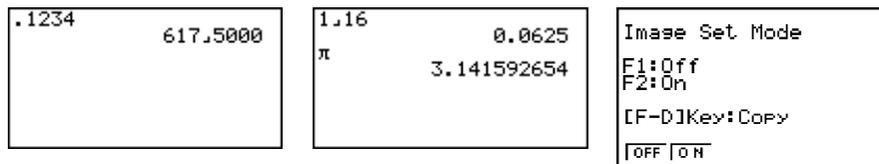
c. SHIFT [d/c] converts mixed numbers to improper fractions and vice versa.
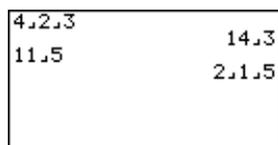
(continued)

To enter and solve $\frac{2}{3} + \frac{1}{2}$, press ⟦2⟧ ⟦a%⟧ ⟦3⟧ ⟦+⟧ ⟦1⟧ ⟦a%⟧ ⟦2⟧ ⟦EXE⟧. The answer to a problem that involves only fractions will be in the form of a fraction or a whole number. However, the answer to a problem that involves a decimal will be in decimal form. To convert the decimal answer to a fraction and vice versa, press ⟦F↔D⟧.

```
2˩3+1˩2
          1˩1˩16
.5(1˩2-1˩4)
          0.125
.5(1˩2-1˩4)
            1˩8
```

As an alternative to using the special fraction keys, you can enter a fraction as a division problem. To work with simple fractions like $\frac{5}{8}$ and improper fractions like $\frac{8}{5}$, simply enter them into your calculator as division problems. To see the answer displayed as a fraction, you must press ⟦F↔D⟧. Often you don't need to use parentheses around a fraction entered as a division, but when in doubt, put in the parentheses.

```
15˩18
          5˩6
2˩3+3˩5
        1˩4˩15
2˩3-3˩5
         1˩15
```

```
2˩3×3˩5
          2˩5
(2˩3)˩(3˩5)
        1˩1˩9
(2˩3)²
          4˩9
```

```
2˩3+3˩5×4˩7-1˩2
         107˩210
```

Note 0B • Exponents

There are two ways to raise a number to a power by using the calculator. The simplest way to square a number (raise it to the second power) is to use the ⟦x²⟧ key. Enter the number you want to square and then press ⟦x²⟧. When you press ⟦EXE⟧, the calculator will multiply the number by itself. For all powers (including the second power, if you want), use the ⟦^⟧ key.

```
3²
           9
3^2
           9
3^4
          81
```

The order of operations requires that you do all operations within parentheses first, evaluate all powers second, multiply and divide from left to right third, and add and subtract from left to right last.

```
2×5²
          50
6+2^4
          22
```

```
(2×5)²
         100
(3+4)^3
         343
```

Note 0C • Negation and Subtraction

Negation and subtraction are performed with different keys on this calculator. Negation, ⟦(−)⟧, changes the sign of a number or a variable. It is slightly shorter than the subtraction symbol. If you enter the wrong symbol, you will get either an error message or an unexpected result.

```
10-7




    Syn   ERROR
```

```
10→X
          10
X-7
           3
X-7

    Syn   ERROR
```

In the order of operations, negation is treated like "multiply by negative 1," so it is performed before addition and subtraction but after evaluation of powers. Sometimes you may need to use parentheses to get the correct result.

(continued)

```
-4+7
-(4+7)            3
                -11
```

```
-4²
                -16
(-4)²            16
```

Note 0D • Recursion

The Ans command on the calculator allows you to use the result of your last calculation in your next calculation. If you press EXE without pressing another key, the calculator will repeat the last operation on the previous result. Combining these two features allows you to perform on-screen recursion, calculating a new number by repeating the operation using the result of the previous calculation. To create patterns of numbers (sequences), follow this procedure:

a. Enter the starting number of your sequence and press EXE.

b. Enter an expression using Ans. You can get Ans by pressing any of the operation keys, such as −, +, ×, ÷, ∧, or x², or by pressing SHIFT [Ans].

c. Press EXE EXE EXE and so on. Each time you press EXE, you will get one more term in the sequence.

```
4
                 4
Ans+7
                11
                18
                25
                32
```

```
4
                 4
Ans×3
                12
                36
               108
               324
```

```
4
                 4
Ans×3-5
                 7
                16
                43
               124
```

Note 0E • The Chaos Game

To play the Chaos game, follow these steps:

a. Link or manually enter the CHAOS program into your calculator. (See **Note 0F** and **Note 0G.**)

b. From the Main Menu, arrow to PRGM and press EXE. Arrow down to select CHAOS and press EXE to execute the program.

c. You are asked to choose a Chaos shape. Press 4 to see more shapes. Press the appropriate number to select a shape.

d. You are then asked to enter a fraction between 0 and 1. You can enter this value as either a fraction or a decimal number. Press EXE. The calculator will plot 1000 points by following the Chaos rules to plot a fractal.

e. When the program is done, press EXE to play again or AC/ON to quit.

```
Program List
 LINES1      :  342↑
 LINES2      :  319
 WALKER      : 1422
 PARADAY     :  512
 CHAOS       :  931
 RPT DEC     :  191↓
EXE EDIT NEW DEL DEL'  ▷
```
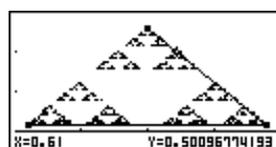
```
CHAOS SHAPES
1.RIGHT TRIANGLE
2.EQUILATERAL TRIANG
3.RANDOM TRIANGLE
4.MORE?
```

```
5.SQUARE
6.PENTAGON
7.HEXAGON
8.GO BACK
?
2
```

```
EQUILATERAL TRIANGLE

ENTER A FRACTION
BETWEEN 0 AND 1?
.56
```

```


       ▲
      ▲▲
     ▲  ▲
    ▲▲  ▲▲
   ▲     ▲
  ▲▲    ▲▲
X=0.61      Y=0.50096774193
```

(continued)

Discovering Algebra Calculator Notes for the Casio fx-9750G Plus and CFX-9850GC Plus

```
File Name:CHAOS
ClrText
"CHAOS SHAPES"
Lbl 0
"1.RIGHT TRIANGLE"
"2.EQUILATERAL TRIANG"
"3.RANDOM TRIANGLE"
"4.MORE"?→A
A<4⇒Goto 1
ClrText
"5.SQUARE"
"6.PENTAGON"
"7.HEXAGON"
"8.GO BACK"
?→A
Lbl 1
A=1⇒Goto 2
A=2⇒Goto 3
A=3⇒Goto 4
A=5⇒Goto 5
A=6⇒Goto 6
A=7⇒Goto 7
A=8⇒Goto 0
Lbl 2
ClrText
" RIGHT TRIANGLE"
{.05,.95,.05}→List 1
{.05,.05,.65}→List 2
Goto 8
Lbl 3◢
ClrText
" EQUILATERAL TRIANGLE"
{.05,.95,.5}→List 1
{.05,.05,.65}→List 2
Goto 8
Lbl 4
ClrText
" RANDOM TRIANGLE"
{Ran#,Ran#,Ran#}→List 1
{.7×Ran#,.7×Ran#,.7×Ran#}→List 2
Goto 8
```

```
Lbl 5
ClrText
" SQUARE"
{.2,.8,.8,.2}→List 1
{.05,.05,.65,.65}→List 2
Goto 8
Lbl 6
ClrText
" PENTAGON"
.5+.35sin (72°×{0,1,2,3,4})→List 1
.35+.35cos (72°×{0,1,2,3,4})→List 2
Goto 8
Lbl 7
ClrText
" HEXAGON"
.5+.35sin (60°×{0,1,2,3,4,5})→List 1
.35+.35cos (60°×{0,1,2,3,4,5})→List 2
Lbl 8
ClrGraph
ViewWindow 0,1.1,.25,-.2,.7,.25
S-Gph2 DrawOff
S-Gph3 DrawOff
S-WindMan
S-Gph1 DrawOn,xyLine,List 1,List 2,1,Square
DrawStat
List 1[1]→X:List 2[1]→Y
Dim List 1→N
F-Line X,Y,List 1[N],List 2[N]
"ENTER A FRACTION"
"BETWEEN 0 AND 1"?→F
"WHEN DONE, PRESS AC"
"TO QUIT OR EXE TO"
"PLAY AGAIN."
For 1→J To 500
Next
For 1→J To 1000
Int (N×Ran#+1)→P
X+(List 1[P]-X)×F→X
Y+(List 2[P]-Y)×F→Y
Plot X,Y
Next
```

Note 0F • Linking Programs or Lists

To transfer a program or list from one calculator to another, follow these steps:

    a. Remove the connector covers and connect two calculators by using a link cable. Be sure that the connection is tight on each unit. Keep the covers in a safe place so that you can replace them after you finish your data communications.

b. Turn on both calculators, and on each one select ʟɪɴᴋ from the
Main Menu and press EXE. Press F6 (ɪᴍɢᴇ). Press F2 (ᴍᴏɴᴏ)
or F3 (ᴄᴏʟʀ).

c. On the **receiving calculator,** press F2 (ʀᴇᴄᴠ) so that the calculator
displays ʀᴇᴄᴇɪᴠɪɴɢ....

d. On the **sending calculator,** press F1 (ᴛʀᴀɴ). Press F1 (ꜱᴇʟ).

e. Arrow down to the program or data that you want to send.

Press F1 (ꜱᴇʟ) to select a program or list. You can select more than
one program and/or list and send them simultaneously. Just
continue to arrow down, pressing F1 (ꜱᴇʟ) at each program or list
you want to transfer. Then press F6 (ᴛʀᴀɴ). When you are ready
to transmit, press F1 (ʏᴇꜱ).
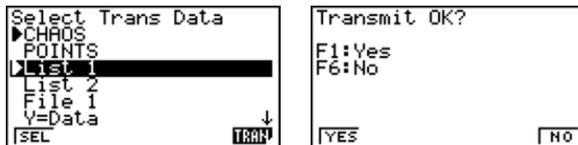
f. When the transfer is complete, **Communication Complete!** will show on
the screens of both the sending and receiving calculators.

Errors

If you get a **Transmit ERROR!** message, check each calculator to be sure that
the link cable is pushed all the way in and try again. Remember that after
you arrow to the program or list you want to send, you must press F1 (ꜱᴇʟ)
to select it before you press F6 to transmit. Also, the receiving calculator
must be **Receiving** before the sending calculator transmits. If the receiving
calculator already has a program or list by the same name as the one you
are sending, the receiving calculator will show **Already Exists Overwrite?**. Select
F1 (ʏᴇꜱ) to overwrite or F2 (ɴᴏ) to skip transferring this item.

Note 0G • Entering a Program

Your calculator is like a small computer. You can instruct (or program) it to
do calculations or to communicate with other devices. What follows is not
instructions on how to write a program, but instructions on how to enter a
calculator program that has already been written. You must be very careful
to enter the commands exactly as they are written. Changing the program in
any way will alter how it runs and may cause an error.

There are three ways to enter a program into your calculator. Two easy ways
are to download a program from either a computer or another calculator. To

use a computer, download the program from a CD or website directly into your calculator by using Casio FA-122 or FA-123 Program-Link™ software and the appropriate cable. To use another calculator that has the program in its memory, link the two calculators with a link cable and transfer the program. (See **Note 0F.**) The third way to enter a program is to do it manually by following the steps below:

a. Arrow to PRGM on the Main Menu and press EXE .

b. Press F3 (NEW) and name the program by pressing each letter or number of the name. (Use the red letters above the number and operations keys.) The blinking A indicates you are already in Alpha Lock, so do not press ALPHA unless you want to enter a number in the program name. When the name is complete, press EXE .

c. Enter the program exactly as you see it. Lowercase letters in the command indicate that you must find the command on the calculator. You can find many programming commands by pressing SHIFT [PRGM] and pressing the function keys (F1 , F2 , and so on) to see the available commands. You can find other commands, functions, and symbols by pressing SHIFT [SET UP] or the VARS , SHIFT , F4 (MENU), F6 (SYBL), ALPHA , and OPTN keys. A complete list of programming commands can be found in your calculator's *User's Guide.* If you enter a command from the calculator text screen, all the letters will be uppercase. The command won't look the same, and it won't work.

d. Use SHIFT [INS] EXE to insert a new line between two lines. Use DEL on a blank line to delete that line.

e. When you finish entering the program, press EXIT repeatedly until you return to the program list. Then, press EXE or F1 (EXE) to run the program.
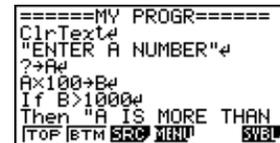
Errors

You can edit the program if an error occurs or if you need to make a change.

a. Select PRGM from the Main Menu. Arrow down to the program name and press F2 (EDIT).

b. Scroll down through the program to find the error. Studying the entire program on paper is often easier than working from the calculator screen where you can see only a small portion at one time. Use SHIFT [INS] or DEL as needed to make changes.

(continued)

c. If you get an error message when you execute a program, press the left or right arrow key. The calculator will automatically switch to the EDIT mode and scroll to the line with the error. Then proceed as in **step b.**

```
ENTER A NUMBER
?
11
A IS MORE THAN 10


     Syn  ERROR
```
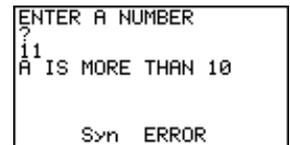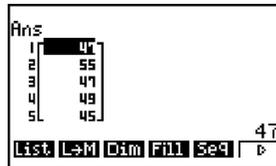
Note 0H • Generating Random Integers

You can generate random integers within an interval using the Int and Ran# commands. From the Run screen, press OPTN F6 F4 (NUM) F2 (Int) to access the integer part command. Press OPTN F6 F3 (PROB) F4 (Ran#) to access the random number command.

To randomly generate integers between two values, enter Int (Ran#(H − L + 1)) + L, where H is the highest integer and L is the lowest integer. For example, to generate integers between 43 and 57, enter Int(Ran#(15))+43. Pressing EXE will generate as many of these integers as you like.

```
Int (Ran#(15))+43
                44
                52
                54
                47
                47
x! nPr nCr Ran#    ▷
```

To randomly generate a particular number of integers in an interval—for example, five integers between 43 and 57—select the Seq command by pressing OPTN F1 (LIST) F5 (Seq), enter the formula as before, and then add ,X,1,5,1 to generate five random numbers in this interval.

```
Seq(Int (Ran#×(15+1))
+43,X,1,5,1)



List L→M Dim Fill Seq  ▷
```

```
Ans
1[  4T
2   55
3   47
4   49
5L  45]
                47
List L→M Dim Fill Seq  ▷
```

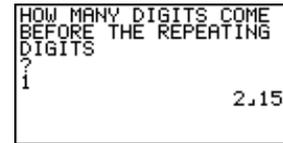## Note 0I • The Repeating Decimal Program

The RPT DEC program can be used to convert a repeating decimal to a fraction. Follow these steps:

a. Link or manually enter the program into your calculator. (See **Note 0F** and **Note 0G.**)

b. In the Main Menu, arrow to PRGM and press EXE. Use the down arrow to select the program labeled RPT DEC and press EXE.

c. You are asked to enter your decimal. Enter your decimal, including at least one digit more than one repeating cycle, and press EXE. For example, if your number is .133333 . . . , you could enter .133, .1333, or .13333, and so on.

```
ENTER DECIMAL
?
.133
```

d. You are then asked how many digits repeat. In our example, the 3 is the only digit that repeats, so press 1 and EXE.

```
ENTER DECIMAL
?
.133
HOW MANY DIGITS↵
REPEAT
?
1
```

e. You are next asked how many digits come before the repeating digits. In our example, .133333 . . . , there is one digit (the 1), so press 1 and EXE.

```
HOW MANY DIGITS COME
BEFORE THE REPEATING
DIGITS
?
1
```
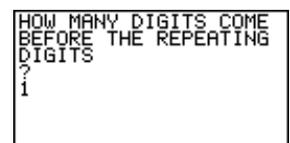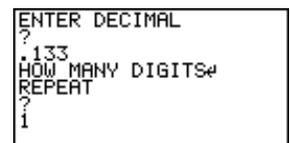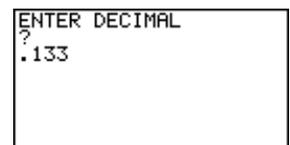
(continued)

f. The equivalent fraction will be displayed on the screen. You can then use $\boxed{\text{F}\leftrightarrow\text{D}}$ to convert back and forth between fraction and decimal.

```
HOW MANY DIGITS COME
BEFORE THE REPEATING
DIGITS
?
1
                2.15
```

```
File Name:RPT DEC
"ENTER DECIMAL"
?→N
"HOW MANY DIGITS"
"REPEAT"?→P
"HOW MANY DIGITS COME"
"BEFORE THE REPEATING"
```

```
"DIGITS"?→L
Int (10^L×N)→R
Frac (10^L×N)→S
Int (S×10^P)→C
(10^P−1)×10^L→B
10^L→A
R⌐A+C⌐B
```