Chapter 11

Dual Graph

Dual Graph lets you split the display between two different screens, which you can then use to draw different graphs at the same time. Dual Graph gives you valuable graph analysis capabilities.

• You should be familiar with the contents of "8-3 Graph Function Operations" before reading this chapter.

11

11-1 Before Using Dual Graph

1. From the Main Menu, enter the **GRAPH** Mode. Next, display the set up screen and specify "**Graph**" for Dual Screen.

2. Press EXIT.

```
Graph Func  :Y=
Y1:
Y2:
Y3:
Y4:
Y5:
Y6:
[SEL][DEL][TYPE][COLR][GMEM][DRAW]
```
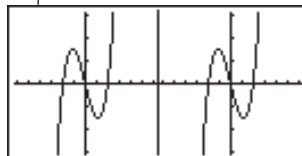
- For further details about the function key menu at the bottom of the display, see "8-1 Before Trying to Draw a Graph".
- 8,192 bytes of memory are used whenever you set the Dual Screen setting to "Graph".

■ About Dual Graph Screen Types

The screen on the left side of the display is called the *active screen*, and the graph on the left side of the display is called the *active graph*. Conversely, the right side is the *inactive screen*, which contains the *inactive graph*. Any function that you execute while using Dual Graph is always applied to the active graph. To execute a function on the right-side inactive graph, you must first make it active by moving it into the active screen.

Active Screen
Actual graph drawing is done here.

Inactive Screen

Use the inactive screen to make copies of active screen graphs, and for the result of Zoom operations.

- Indicators appear to the right of the formulas in the function memory list to tell where graphs are drawn with Dual Graph.

```
Graph Func  :Y=
Y1=X(X+2)(X-2)      R
Y2=2X²-3           B
```

Indicates inactive graph (on right side of display)

Indicates graph drawn on both sides of display

Performing a draw operation with the function marked "**R**" in the above example screen causes the graph to be drawn on the right (inactive) side on the display. The function marked "**B**" is drawn on both sides of the graph.

Pressing F1 (SEL) while one of the function's is highlighted would causes its "**R**" or "**B**" indicator to be cleared. A function without an indicator is drawn as the active graph (on the left side of the display).

11-2 Specifying the Left and Right View Window Parameters

You can specify different View Window parameter for the left and right sides of the graph display.

● **To specify View Window parameters**

Press [SHIFT] [F3] (V-Window) to display the View Window parameter setting screen for the active (left side) graph.

```
View Window:Left
Xmin :-6.3
  max :6.3
  scale:1
Ymin :-3.1
  max :3.1
  scale:1
INIT TRIG STD STO RCL RIGHT
```

• {**INIT**}/{**TRIG**}/{**STD**} ... View Window {normal initialization}/{trigonometric initialization}/{standardization}

• {**STO**}/{**RCL**} ... View Window setting {store}/{recall}

• {**RIGHT**}/{**LEFT**} ... {active (left)}/{inactive (right)} screen View Window setting swap

• Use the procedures described under "View Window (V-Window) Settings" to input parameter values.

• Use the following key operations to change to different screens while inputting View Window parameters for the left and right side screens.

  While the View Window parameter setting screen for the active graph is shown:

• [F6] (RIGHT) .... displays the inactive graph View Window parameter setting screen

  While the View Window parameter setting screen for the inactive graph is shown:

• [F6] (LEFT) ...... displays the active graph View Window parameter setting screen

11-3   Drawing a Graph in the Active Screen

You can draw graphs only in the active screen. You can then copy or move the graph to the inactive screen.

● **Drawing a graph in the active screen**

_____
 Example   To draw the graph of $y = x\,(x + 1)\,(x - 1)$

Use the following View Window parameters:

Xmin = –2	**Ymin = –2**
Xmax = 2	**Ymax = 2**
Xscale = 0.5	**Yscale = 1**

Input the function.

[X,θ,T] [(] [X,θ,T] [+] [1] [)] [(] [X,θ,T] [−] [1] [)]

Store the function.

[EXE]

Draw the graph.

[F6] (DRAW) or [EXE]

11-4 Displaying a Graph in the Inactive Screen

There are two methods you can use to display a graph in the inactive screen. You can copy a graph from the active screen to the inactive screen, or you can move the graph from the active screen to the inactive screen. In both cases, you must first draw the graph in the left-side active screen.

■ Before Displaying a Graph in the Inactive Screen

After drawing a graph in the active screen, press [OPTN], and the Dual Graph function menu appears at the bottom of the display.

P.139

- {**COPY**} ... {copies active graph to inactive screen}
- {**SWAP**} ... {switches active screen and inactive screen}
- {**PICT**} ... {picture function}

■ Copying the Active Graph to the Inactive Screen

Example   To draw the graph for $y = x (x + 1) (x - 1)$ on the active screen and the inactive screen

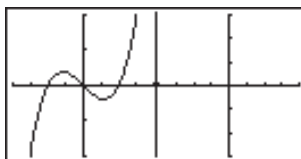Use the following View Window parameters:

Active (Left) Screen View Window parameters		Inactive (Right) Screen View Window parameters	
Xmin = –2	Ymin = –2	Xmin = –4	Ymin = –3
Xmax = 2	Ymax = 2	Xmax = 4	Ymax = 3
Xscale = 0.5	Yscale = 1	Xscale = 1	Yscale = 1

Assume that the function being graphed is stored in memory area Y1.

```
Graph Func  :Y=
Y1=X(X+1)(X-1)
```
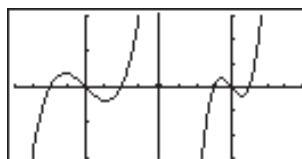
Draw the graph in the active screen.
[F6](DRAW)

Copy the graph to the inactive (right) screen.
[OPTN] [F1](COPY)

- The graph is reproduced using the inactive screen View Window parameters.

■ Switching the Contents of the Active and Inactive Screens

Switch the screens.

(OPTN) (F2)(SWAP)

• Note that using (F2) (SWAP) to switch the screens also switches their View Window parameters.

■ Drawing Different Graphs on the Active Screen and Inactive Screen

Example **To draw the graphs of the following functions on the screens noted:**

Active Screen: $y = x (x + 1) (x - 1)$

Inactive Screen: $y = 2x^2 - 3$

Use the View Window parameters shown below.

Active (Left) Screen View Window parameters		Inactive (Right) Screen View Window parameters	
Xmin = –4	Ymin = –5	Xmin = –2	Ymin = –2
Xmax = 4	Ymax = 5	Xmax = 2	Ymax = 2
Xscale = 1	Yscale = 1	Xscale = 0.5	Yscale = 1

Assume that the functions being graphed are stored in memory areas Y1 and Y2.

Select the function for the graph that you want to end up in the inactive (right) screen.
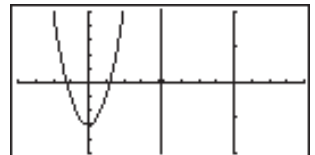
(F1)(SEL)

```
Graph Func  :Y=
Y1=X(X+1)(X-1)
Y2=2X²-3
```

```
Graph Func  :Y=
Y1=X(X+1)(X-1)
Y2=2X²-3
```

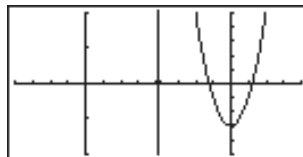Draw the graph in the active screen.

(F6)(DRAW)

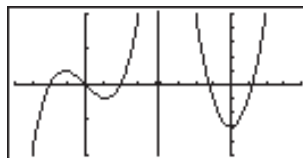Swap the screens so the graph is on the inactive (right) screen.

[OPTN] [F2](SWAP)

Select the function for the graph that you want in the now-empty active (left) screen.

[AC] [F1](SEL)

```
Graph Func  :Y=
V1=X(X+1)(X-1)
V2=2X²-3          R
```
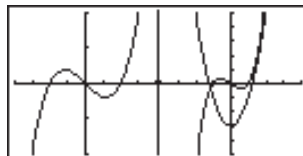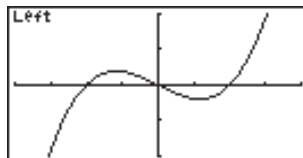
Draw the graph.

[F6](DRAW)

• At this point, you could perform a copy operation and superimpose the active graph over the inactive graph.
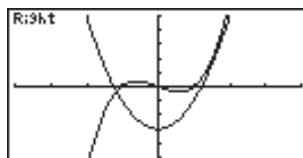
[OPTN] [F1](COPY)

• Pressing [SHIFT] [F6] (G↔T) lets you switch between display of the active and inactive graphs, using the entire display for each.

[SHIFT] [F6](G↔T)

Left

[SHIFT] [F6](G↔T)

Right

[SHIFT] [F6](G↔T)

```
Graph Func  :Y=
V1=X(X+1)(X-1)    B
V2=2X²-3          R
```

173

■ **Other Graph Functions with Dual Graph**

P.128

After drawing a graph using Dual Graph, you can use the trace, zoom, sketch and scroll functions. Note, however, that these functions are available only for the active (left) graph. For details on using these functions, see "8-6 Other Graphing Functions".

- To perform any of the above operations on the inactive graph, first move the inactive graph to the active screen.
- The graph screen will not scroll while a trace operation is being performed on the active graph.

The following shows some example operations using the zoom function.

Example 1   To use box zoom to enlarge the graph of $y = x \, (x + 1) \, (x - 1)$

Use the following View Window parameters for the active graph.

Xmin = –2	Ymin = –2
Xmax = 2	Ymax = 2
Xscale = 0.5	Yscale = 1

Assume that the function is already stored in memory area Y1.
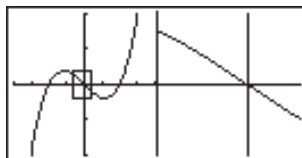
```
Graph Func  :Y=
Y1=X(X+1)(X-1)
```

Press F6 (DRAW) or EXE to draw the graph.

   SHIFT F2 (Zoom) F1 (BOX)

- Use the cursor keys to move the pointer to one of the corners of the box and then press EXE.

```
X=0.19354838709 Y=-0.3870967741
```

- Use the cursor keys to move to the opposite corner of the box and then press EXE to enlarge the graph.

- The zoom operation changes the View Window parameters of the inactive screen, so the graph in the inactive screen is cleared.