

## Investigating Radical Functions with the *fx-9750G PLUS* An Algebra Activity

Talk to your teammates – decide what you think the graph of  $y = \sqrt{x}$  would look like. Explain why you think so. Choose several points that you think would be on the graph. Are there values that would be excluded from the domain? If so, which ones?

Let's begin the investigation by looking at a table of values for our function. From the main menu, choose TABLE, enter  $\sqrt{x}$  in  $Y1 =$ . Press F5 (RANG) to set the table range. Start at 0, end at 100 with a pitch of 1. Press EXE, then press F6 to view the table. Toggle down the table. What do you notice about the values in  $Y1$ ? Which values of  $x$  yield integer values in  $Y1$ ? Why?

```
Table Func :Y=
Y1:√X
Y2:
Y3:
Y4:
Y5:
Y6:
SEL DEL TYPE RANG TABL
```

```
Table Range
X
Start:0
End :100
Pitch:1
```

X	Y1
0	0
1	1
2	1.4142
3	1.732

10

X	Y1
13	3.6055
14	3.7416
15	3.8729
16	4

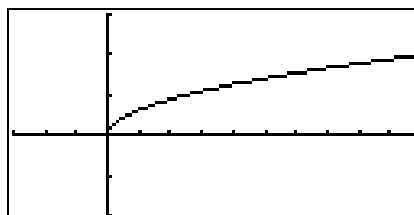
16

Now let's take a look at the graph. Return to the main menu and select GRAPH. Discuss with your group what you think an appropriate view window might be. Try them out. For our investigation, let's use:

Xmin : -30  
 max : 100  
 scale : 10  
 Ymin : -10  
 max : 15  
 scale : 5

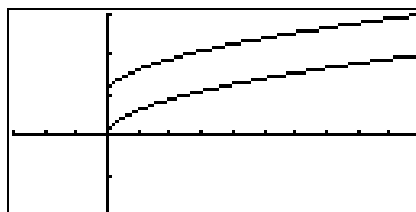
Press F6 (DRAW) to see the graph. Does it look like you expected? Why? Why not? Talk to your group about why it has this shape and why the graph is only in the first quadrant.

```
View Window
Xmin : -30
max : 100
scale:10
Ymin : -10
max : 15
scale:5
INIT TRIG STO STO RCL
```



What do you think the graph of  $y = \sqrt{x} + 5$  would look like? Talk it over with your group. Leaving the first equation in Y1, enter this equation in Y2. How did you do?

```
Graph Func :Y=
Y1:√X
Y2:√X+5
Y3:
Y4:
Y5:
Y6:
[SEL] [DEL] [TYPE] [MEM] [DRAW]
```

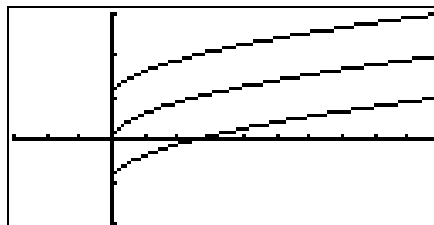


Let's take a look at the table now. How do the values in Y1 and Y2 compare?

X	Y1	Y2
1	1	6
2	1.4142	6.4142
3	1.732	6.732

Enter  $y = \sqrt{x} - 5$  in Y3. Predict what it will look like. Why is a portion of this graph in the fourth quadrant?

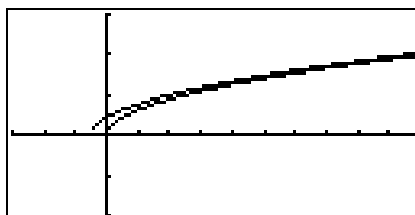
```
Table Func :Y=
Y1:√X
Y2:√X+5
Y3:√X-5
Y4:
Y5:
Y6:
To Store : [EXE]
```



Talk with your teammates. What generalizations can you make about the family of graphs  $y = \sqrt{x} + a$ ?

Now, delete the function in Y3 and edit the function in Y2 to  $Y2 = \sqrt{x+5}$ . Which values of  $x$  would yield integer values in Y2. Predict what you think the graph will look like.

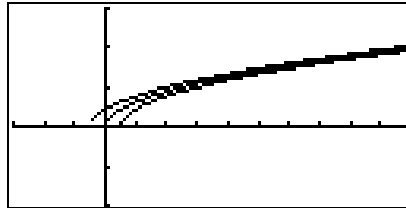
```
Graph Func :Y=
Y1:√X
Y2:√(X+5)
Y3:
Y4:
Y5:
Y6:
To Store : [EXE]
```



Enter  $y = \sqrt{x-5}$  in Y3. What do you expect the graph to look like?

```

Graph Func :Y=
Y1E√x
Y2E√(X+5)
Y3E√(X-5)
Y4:
Y5:
Y6:
[SEL] [DEL] [TYPE] [ZMEM] [DRAW]
    
```



Look at the table values. Toggle down; what do you notice about the values in Y1, Y2, and Y3 as X increases?

X	Y1	Y2	Y3
0	0	2.236	ERROR
1	1	2.4494	ERROR
2	1.4142	2.6457	ERROR
3	1.732	2.8284	ERROR

X	Y1	Y2	Y3
97	9.8488	10.099	9.5916
98	9.8994	10.148	9.6436
99	9.9498	10.198	9.6953
100	10	10.246	9.7467

What generalizations can you make about the family of graphs  $y = \sqrt{x+a}$ ?

X	Y1	Y2	Y3
1000	31.622	31.701	31.543
10000	100	100.02	99.974
1E6	1000	1000	999.99
1E7	3162.2	3162.2	3162.2

**Extension:** Police officers use radical functions to determine the speed of a car given the length of the skid mark it leaves at an accident. What other real life examples of radical functions can you find?