Using Table Values to Choose Window Settings MathPrint View

Objectives:

- Observe that the standard graphing window can be inappropriate
- Use the table to identify x-axis Window settings
- Use the table to identify y-axis Window settings

Observe that the standard graphing window can be inappropriate

Confusing Example 1: Graph $y = \sqrt{x - 11}$ in the standard window.

Press

statplot f1					I link	]	W L1	Y L1	Y	entry solve format f3 L6	V
y=	clear	2nd	x²	X,T,θ,n	−	1	1	▶	enter	zoom	6

See:
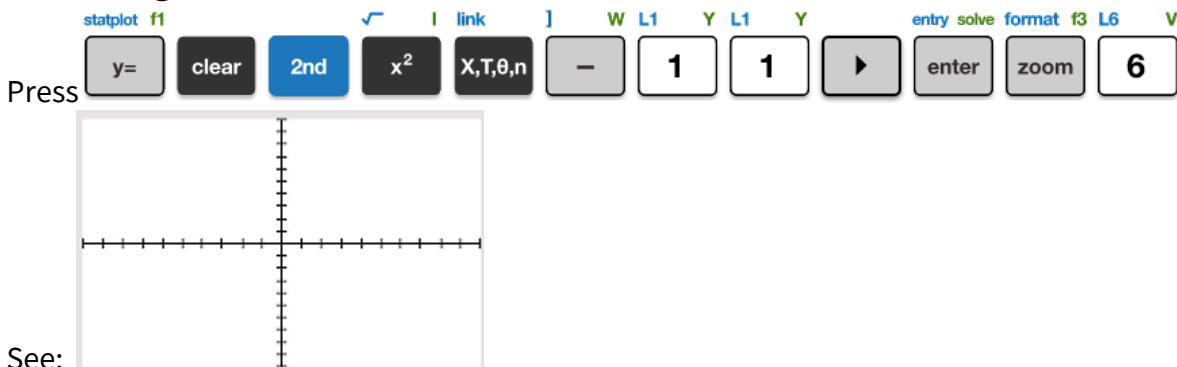
This is an example of a graph which is located entirely outside the standard window. Either the x-values are greater than 10 or less than -10, and/or the y-values are greater the 10 or less than -10! Or both!

Use the table to identify x-axis Window settings

Example 1, continued: Make an automatic table for $y = \sqrt{x - 11}$ and change the window.

Set up an automatic table by pressing:

tblset f2 ans		? L1	Y catalog ⌴ entry solve L1		Y entry solve ☼	≣ entry solve		table f5		☼ ≣
2nd	window	(−)	1	0	enter	1	enter	▼	enter	2nd
graph								▼		

and ▼ many times.

See:

```
NORMAL FLOAT AUTO REAL RADIAN MP

TABLE SETUP
 TblStart=-10■
 ⌂Tbl=1
Indpnt: Auto Ask
Depend: Auto Ask
```

X	Y₁
-10	ERROR
-9	ERROR
-8	ERROR
-7	ERROR
-6	ERROR
-5	ERROR
-4	ERROR
-3	ERROR
-2	ERROR
-1	ERROR
0	ERROR

X	Y₁
8	ERROR
9	ERROR
10	ERROR
11	0
12	1
13	1.4142
14	1.7321
15	2
16	2.2361
17	2.4495
18	2.6458

IMPORTANT: The equation is not defined for values of x that are less than 10, so no graph appears. We want x-values to the right of the standard screen, $x \geq 11$, so Xmax=10 is too small.

Press:

tblset f2 ☼	≣ L2	Z catalog ⌴ table f5		
window	▼	2	0	graph

See:

```
NORMAL FLOAT AUTO REAL RADIAN MP

WINDOW
 Xmin=-10
 Xmax=20■
 Xscl=1
 Ymin=-10
 Ymax=10
 Yscl=1
```
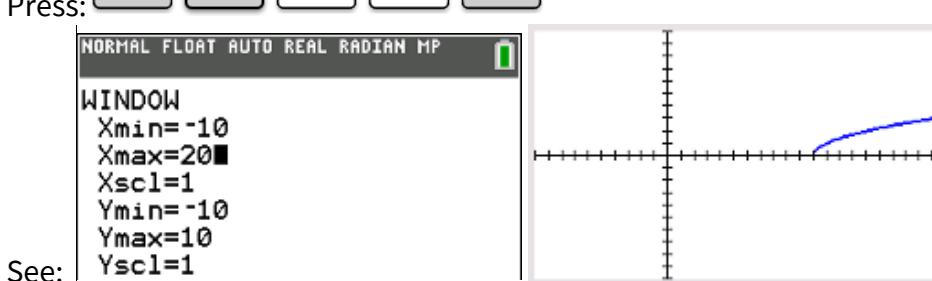
PRO TIP: There is a lot of blank space on this graph which we could remove by refining the Window.

Press:
| window | (−) | 1 | ▼ | ▼ | ▼ | (−) | 1 | ▼ | 5 | graph |

See:
```
WINDOW
 Xmin=-1
 Xmax=20
 Xscl=1
 Ymin=-1
 Ymax=5
 Yscl=1
```

CAUTION: If Xmin is greater than 0, the y-axis will disappear from the screen. Don't draw a graph with no y-axis on your paper, because we can't tell what the ticks mean!

Press | window | 5 | graph | to see
```
WINDOW
 Xmin=5▮
 Xmax=20
 Xscl=1
 Ymin=-1
 Ymax=5
 Yscl=1
```
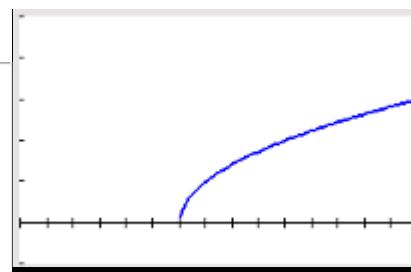
Use the table to identify y-axis Window settings

Example 2: Graph $y = -x^2 - 11$ in the standard window, use a table, then re-graph.

Press | y= | clear | (−) | X,T,θ,n | x² | − | 1 | 1 | enter | zoom | 6 | See empty axes again!

Restart table at -10, press | 2nd | window | (−) | 1 | 0 | 2nd | graph | and | ▼ | many times.

See:
X	Y₁
-10	-111
-9	-92
-8	-75
-7	-60
-6	-47
-5	-36
-4	-27
-3	-20
-2	-15
-1	-12
0	-11

X	Y₁
0	-11
1	-12
2	-15
3	-20
4	-27
5	-36
6	-47
7	-60
8	-75
9	-92
10	-111

All the y-values are smaller than -10, so no graph appears.
We want y-values to the bottom of the standard screen, $y \le -11$, so Ymin=-10 is too big.

Press: | window | ▼ | ▼ | ▼ | clear | (−) | 2 | 0 | graph |

See:
```
WINDOW
 Xmin=-10
 Xmax=10
 Xscl=1
 Ymin=-20
 Ymax=10
 Yscl=1
 Xres=1
 ΔX=0.075757575757576
 TraceStep=0.151515151515…
```
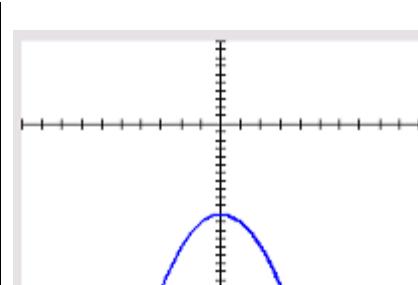
Again, we can refine the window, with (for example) Xmin=-5, Xmax=5, Ymax=1, keeping Ymax >0.