Decreasing the Window MathPrint View

Objectives:

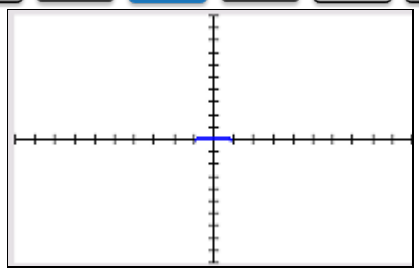
- Using Zoom In to decrease the window
- Understand some limitations of using the zoom menu
- Decreasing the window using Window settings

Using Zoom In to decrease the window

Example 1: Graph $y = \frac{\sqrt{1-x^2}}{8}$ in the standard window, then Zoom Out centered at (0,0).

Press:

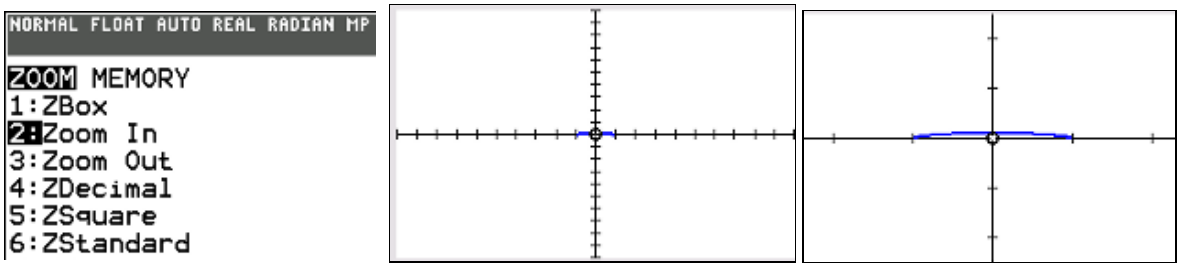
See:



Divide by 8 is small, so perhaps Zoom In might help. To select Zoom In, press:

To re-draw the graphing using (0,0) as the center of the new window, just press

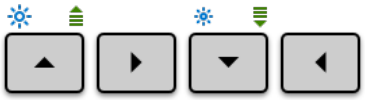
See:



Understand some limitations of using the zoom menu

CAUTION: When using Zoom choices 1-4, the calculator waits the user to indicate the new center of the graph before it re-draws.

IMPORTANT: The cursor's location when you press ENTER will be the new center of the graph.

Note: To use a different center, move the cursor using  , then press 

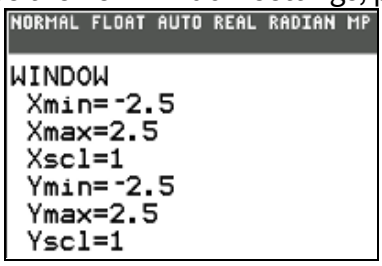
CAUTION: Using zoom IN or OUT is often confusing, because

- it shrinks (enlarges) both the x-axis and the y-axis by the same amount
- the amount it shrinks (enlarges) has nothing to do with the equation in the Y= menu

Example 1 (continued): What window did ZOOM IN give?

To see the new window settings, press: tblset f2 window

See:



The window decreased the same in both x and y directions, from [-10,10] x [-10,10] to [-2.5,2.5] x [-2.5,2.5].

Decreasing the window using Window settings

PRO TIP: The Zoom In result from Example 1 isn't good, but it shows information we can use.
The graph is visible, so Xmin= -2.5 and Xmax = 2.5 might work.
On the y-axis, it appears we don't need Quadrants III and IV, but we need a smaller Ymax.

Example 2: Graph $y = \frac{\sqrt{1-x^2}}{8}$ in a more appropriate window using WINDOW settings.

IMPORTANT: There is not one right answer! Window choice is partly personal taste.

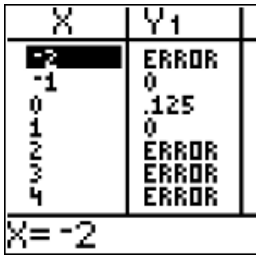
From Example 1, the x-axis might be $-2.5 \le x \le 2.5$, but we need a larger Ymin and smaller Ymax.
Use the value at $x = 0$ to adjust Ymax.

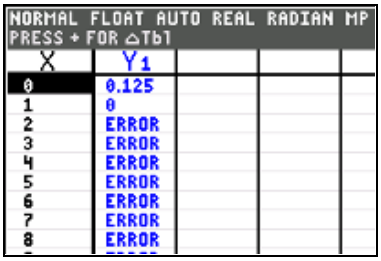
To set up and see a table starting at 0, press:

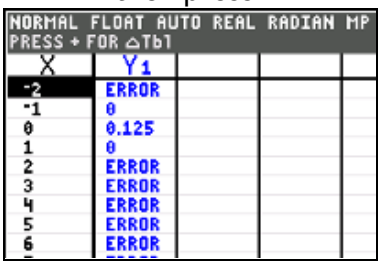
2nd | tblset f2 window | 0 | enter | L1 1 | enter | Y enter | solve enter | solve | ▼ | enter

then press 2nd | table f5 graph and ▲.

See:







The largest y-value is 0.125, yet this function is not defined for x-values less than -2.5 or greater than 2.5!

REMEMBER: Xmin must be less than Xmax, and Ymin must be less than Ymax. Check the negatives!

PRO TIP: When changing window settings, notice whether your calculator automatically erases all of the old value when you type a new value into the window screen. If it doesn't, press clear first.

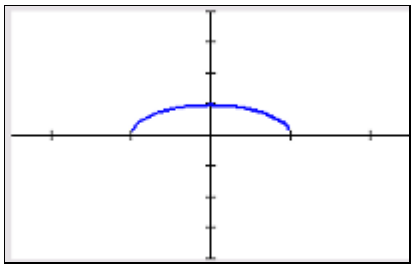
To leave Xmin, Xmax and Xscl unchanged, but set Ymin=-0.5, Ymax=0.5, Yscl=1/8, press:

CAUTION: After changing window settings, press graph, not zoom 6!

PRO TIP: The calculator divides 1/8 to get 0.125!

See:

```
NORMAL FLOAT AUTO REAL RADIAN MP
WINDOW
 Xmin=-2.5
 Xmax=2.5
 Xscl=1
 Ymin=-0.5
 Ymax=0.5
 Yscl=0.125
```



PRO TIP: Either ▼ or enter will move down the WINDOW screen.

Try It!

Graph in an appropriate window.

1) $y = \sqrt{1 - x^2}$

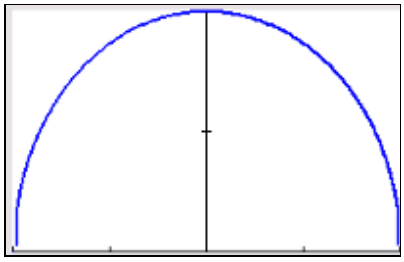
2) $y = \dfrac{1}{\sqrt{1 + x^2}}$

3) $y = \dfrac{1}{5x}$

Answer Hints

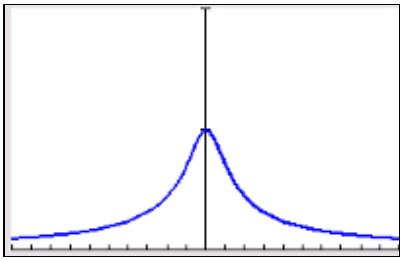
1) Using zoom IN gives distortion near the x-axis, making it look like $y(1)$ is not defined when it is! A good window is:

```
NORMAL FLOAT AUTO REAL RADIAN MP
DISTANCE BETWEEN TICK MARKS ON AXIS
WINDOW
 Xmin=-1
 Xmax=1
 Xscl=0.5
 Ymin=0
 Ymax=1
 Yscl=.5
```



2) Using zoom IN is okay, but this graph is defined for all values of x, so it's better to shrink only the y-axis. A good window is:

```
NORMAL FLOAT AUTO REAL RADIAN MP
WINDOW
 Xmin=-10
 Xmax=10
 Xscl=1
 Ymin=0
 Ymax=2
 Yscl=1
```



3) Use Zoom IN. Don' forget the parentheses!

```
NORMAL FLOAT AUTO REAL RADIAN MP
 Plot1  Plot2  Plot3
\Y1=1/(5X)
\Y2=
\Y3=
\Y4=
```