

1. Let $y = \sqrt{25 - x^2}$.

- Do you know what the graph of this function is?
- What is the domain of the function? _____
- Without your calculator, find some ordered pairs on the function.



Do you know what the graph of this function is now? _____

- Enter the function $y = \sqrt{25 - x^2}$ into Y₁ of your graphing calculator.
- The calculator has certain "windows" that are built in. Each one has advantages and disadvantages. We will look at two of these windows that are built in.

i. **The Standard Window**

Press the ZOOM key and select 6 for 6:ZStandard. After looking at the graph, press WINDOW key and record:

$$X_{\min} = \underline{\hspace{2cm}} \quad X_{\max} = \underline{\hspace{2cm}} \quad Y_{\min} = \underline{\hspace{2cm}} \quad Y_{\max} = \underline{\hspace{2cm}}$$

TRACE on the function.

The advantage(s) of the ZStandard window are _____

The disadvantage(s) are _____

ii. **The Decimal Window**

Press the ZOOM key and select 4 for 4:ZDecimal. After looking at the graph, press WINDOW key and record:

$$X_{\min} = \underline{\hspace{2cm}} \quad X_{\max} = \underline{\hspace{2cm}} \quad Y_{\min} = \underline{\hspace{2cm}} \quad Y_{\max} = \underline{\hspace{2cm}}$$

TRACE on the function.

The advantage(s) of the ZDecimal window are _____

The disadvantage(s) are _____

iii. **Creating and Saving Your Own Window, the Double Decimal Window.**

Press ZOOM 4 to select the Decimal window. Press WINDOW and multiply each of X_{min}, X_{max}, Y_{min}, and Y_{max} by a factor of 2.

To save this window, press ZOOM, the "right arrow" to select MEMORY, and 2 for 2:ZoomSto. This will store the "Double Decimal" window in your calculator's memory.

To access the "Double Decimal" window, press ZOOM, the "right arrow" for MEMORY, and 3 for 3:ZoomRcl.

The advantage(s) of the "Double Decimal" window are _____

2. Solving Equations With the Graphing Calculator

a. Algebraically, solve the equation $\sqrt{25 - x^2} = x$. Check your answers. Write your answer(s) exactly and as a decimal rounded to 2 decimal places.

b. Any equation can be solved graphically, if a decimal approximation is satisfactory. Solve the above equation graphically.

3. Building Functions and Graphing Functions from Application Problems

When graphing a function from an application problem, "the "built-in" windows are almost always unsatisfactory. Therefore, it is necessary to determine the window to be used "by hand".

Can Problem: A soda can (a cylinder) is constructed to hold 355 ml of liquid. (Note: 355 ml equals 355 cubic cm and also equals 12 fl oz).

a. Sketch a picture of the problem.

b. If the radius of the can is 2 cm, what is the height of the can? (Round answers to two decimal places.) _____ What is the surface area of the can? _____

c. If the radius of the can is 6 cm, what is the height of the can? _____ What is the surface area of the can? _____

d. If the radius of the can is x cm, what is the height of the can in terms of x ? _____

e. Write a function $S(x)$, that represents the surface area of the can in terms of x ?

$S(x) =$ _____

f. With your calculator, sketch the graph of $y = S(x)$, and find the dimensions of the can (radius and height) that will minimize the surface area of the can?

Radius = _____ Height = _____ Surface Area = _____

g. What would the radius and height of the can be if 400 cm^2 of material was to be used?

Radius = _____ Height = _____

h. Compare the dimensions found in part vi above to the dimensions of an actual soda can.