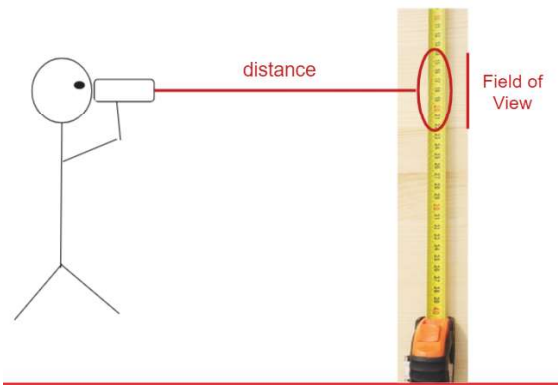


In this activity you will collect data on the **field of view** that you can see through a “telescope” at **varying distances**. You will then use your data to make predictions on the field of view at other distances.

In your group assign one person to look through the telescope, one person to measure the distance from the telescope to the yard stick, one person to call out the field of view diameter, and one person to record the data on the data table below.

Here is a diagram of the set up.



Collect Distance vs FOV Data for FIVE different distances (there will be two blank rows)

Distance (inches)	Field of View (inches)	FOV Estimate from axis using fitted line	Prediction from function $m1(x)$

1. Press Stat and Edit and enter your five Distance and Field of View data values.

## Introduction to Function Notation

### Student Activity (TI-84)

Name \_\_\_\_\_

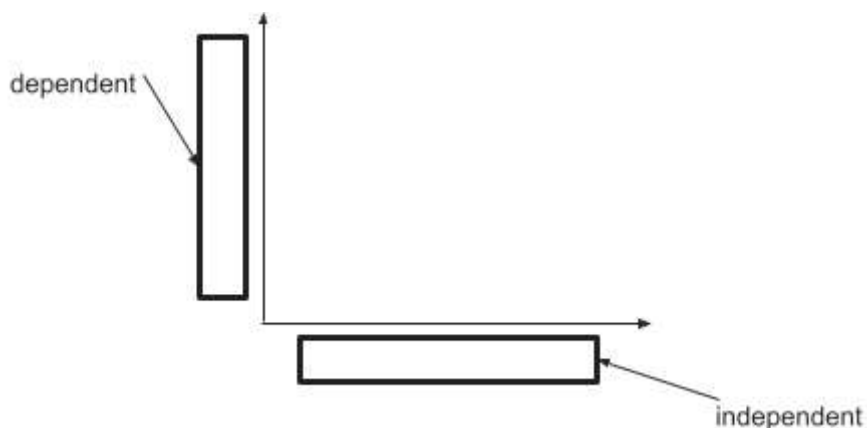
Class \_\_\_\_\_

2. Press 2nd Y= to set up your StatPlot. Determine which variable is the independent variable and which is the dependent variable and make sure you have the correct list assigned to X and Y. Set your Window values and then Graph.

independent variable \_\_\_\_\_  
(variable that does NOT depend on the other)

dependent variable \_\_\_\_\_  
(variable that depends on the other)

Add the variable names to the axes.



3. Insert a Manual-Fit Line by pressing Stat - Calc and then arrow down to Manual-Fit. The screen will ask you to Store EQ. Click on Vars, then arrow over to Y-vars, Function, and select Y1. Then click Enter on Calculate.

The TI-84 will take you to the scatter plot and tell you to Drop Points. Use the arrow keys and Enter to drop two points that are as close to the best fit line as possible. (Clicking the Graph button, the soft-key for STYLE in the bottom right, will let you change the color and thickness of the line.)

When the line is placed you will have a chance to manually enter a value for slope and see the line adjust. Arrowing over to the y-intercept value will allow the manipulation of that value as well.

Let's think about the slope and y-intercept.

If you had a distance of zero, what should your field of view be? \_\_\_\_\_ Adjust your line so that if you put a zero in for the x-variable (the distance) you would get that value as your field of view.

Can you explain what the slope value means with respect to the distance and field of view? For example, as your distance increases 10 inches, your field of view will increase \_\_\_\_\_ inches.

Once you position the line to best model the data, record your equation below. (round to the nearest tenth). When you click the Graph button, that is the soft-key for Done, that will set the line and store it in Y1.

$Y_1(x) =$  \_\_\_\_\_

4. Press Trace and arrow down to place the cursor on the line not the data point. Type the number you have for your 1st distance value. The Trace command should give you the y-value from the manual-fit line. For each of your distance values, estimate the field of view using your fitted line and the axes on your graph. Put these estimations in column 3 in your table.
5. Press 2nd Mode to quit the graph page and return to a calculator page. Use  $Y_1$  function notation to calculate the field of view for the distances in your data. On the calculator page use the VARS button to select  $Y_1$ . Type parentheses and enter the distance, like  $Y_1(\underline{\hspace{1cm}})$ . Put this value in the last column as the Predicted value from the function for each distance (round the decimal to the nearest tenth).
6. Choose a different distance from your horizontal axis and use the linear model to estimate what the field of view would be for that distance. **Add this distance and field of view value to your table above** in the 6th row by filling in “distance” and “FOV Estimate from axis using fitted line” columns. Use the function notation,  $Y_1(dist)$  on the calculator page as well to get the predicted FOV value.

If we stood \_\_\_\_\_ inches from the wall, our field of view would have been \_\_\_\_\_ inches.

7. Select a distance of 100 feet (1200 inches) and use the function notation  $Y_1(1200)$  to calculate your field of view at a 100 foot distance. Put this data in your table on row 7 in the correct columns.

If we stood 1200 inches from the wall, our field of view would have been \_\_\_\_\_ inches.

You can put this data point in your Stat Editor and adjust your Window to see this new data point to verify that it is on the Manual-Fit Line.

### FUNCTION NOTATION

$$m1(dist) = fov$$

$$m1(input) = output$$

$$m1(independent\ var) = dependent\ var$$

$$m1(x) = y$$

Our function was called  $m1$ . Many times we name functions with the letter  $f$ . So a typical function notation is:  $f(x) = y$ .

$x$  is the input,  $y$  is the output

OR

$x$  is the independent variable,  $y$  is the dependent variable