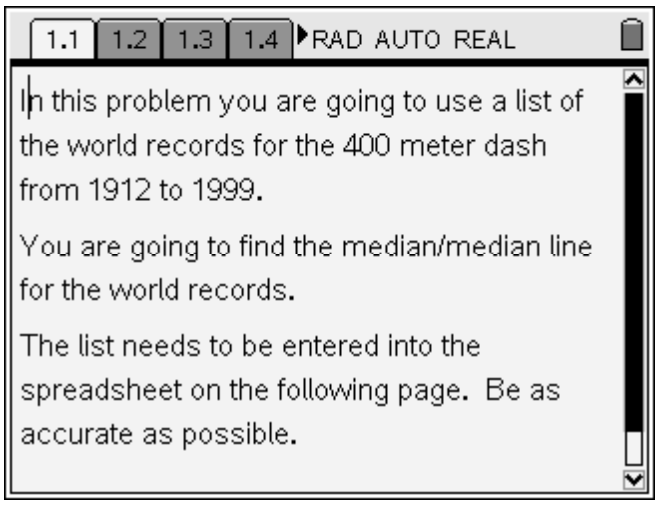
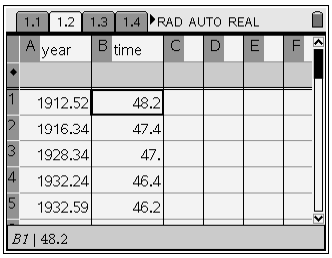
400 Meter World Record
Median/Median Line of Best Fit

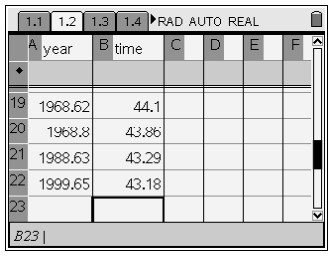
This problem is a problem that we do with our algebra classes and they graph the points and then draw a line of best fit. After they draw the line they come up with an equation for the line in the form y = mx + b. Then predict some value that is asked of them using their equation.

This time in Trig the students will be given the problem on a TI-Nspire. Read the problem to the right. The students have been using the Nspire in class so I do not have to tell them how to move to the next screen. The list is given to them as a worksheet with the same questions asked of them that are in this problem later. They are doing this by hand not just using the calculator to do it for them.



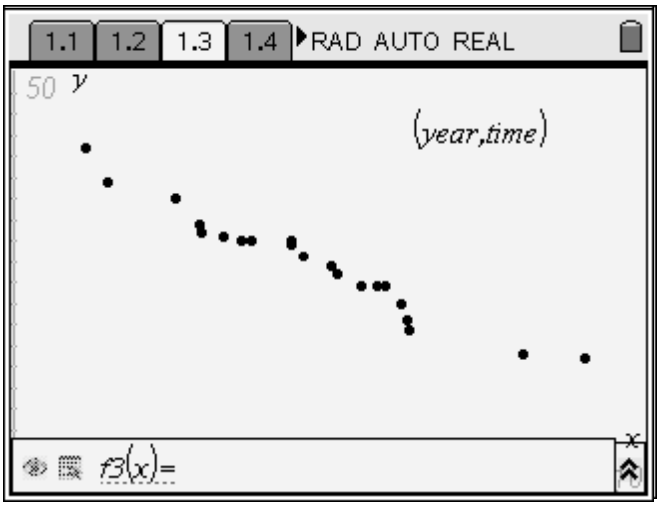
The students will type the dates and times into the lists that are already made in the spreadsheet. Later in the year I would hope they would be able to do this on their own.





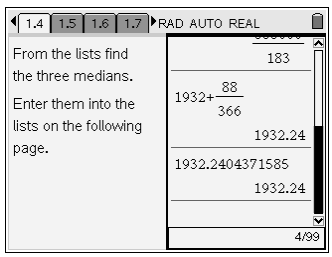
The screens to the right show the list at the beginning and at the end. Their are 22 data points in the list for the yeas 1912 to 1999.

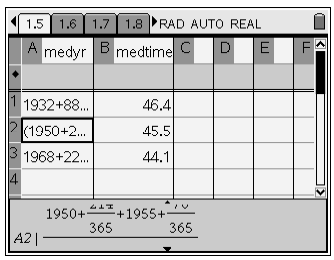
The next page is a graph of the world records on a graph screen that has minimum x of 1900 max of 2010, min y of 35 and max of 50 seconds. The reason we start with a minimum y so low is that the function line at the bottom of the page will cover up the bottom of the graph so you need to go lower that you might think or points will disappear behind the function line.



The graph look like it could be linear so finding a median/median equation might fit.

The next page 1.4 is a text screen that tells them that they need to find the three medians for the data and that they are to type them into the next page. The split is a calculator screen and you can see how I used it to change the dates to decimals. The lists on the next page are Medyr and Medtime. They are also in column A and B but the list names are what we will be using later. On the screen I typed the second median in as an average of the two middle numbers in the second section





The next page is just a graph of the median points. I wanted them to be able to see the points by themselves so they would have an idea how the middle one compared to the first and third.

The next page (page 1.7) is there so the students could do some calculations. It is a split page with directions on the left and a calculator page on the right.

You can see I did some calculations there to find the slope (m) and Y-int (b). So I would not have to type the numbers over and over again and so I could keep the accuracy of the numbers I stored them in m and b the top and bottom of what you can see on page 1.7. I try to stress this to the student with both the TI-84 calculators and the Nspire. You can see on page 1.8 that the f1(x)=m*x+b is on the screen and in f1(x) in the function bar.

The next page 1.9 is another text and calculator split page so they can find the value that the line is below the middle median and then divide it by 3 to get the amount that they need to move the line up so it is closer to the middle median. I used the store function to add the distance moved to the Y-int and store it as c so on page 1.10 I could just graph f2(x) = mx + c for the median/ median line.

The last page 1.11 is the question that they are going to try to answer. Read the question to the right. They will go back to page 1.10 their graph and trace it and type in a number for the date August 22, 2008. I used 2008.696 for my answer. Look at the new page 1.10 next and see the ordered pair that gives the point that represents the date and the time from their median/median line. (2008.70, 41.7018)

The use of the Nspire makes the organization of this type of a problem that has so many step almost easy. As I said before I would hope that the students would be able to do this type of problem creating the pages on their own.