

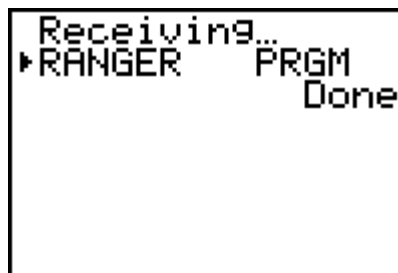
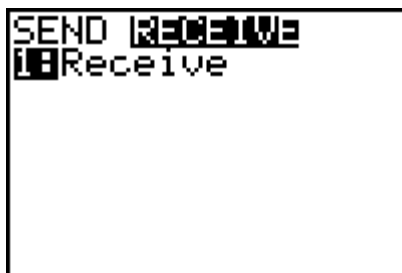
Trip to Tulsa - Algebra 1

In this investigation you will work with your team to collect data with the CBR (Calculator Based Ranger). that will simulate a trip to and from Tulsa. The goal of the investigation to identify if there is a place along the trip at which you would be at the same time, coming and going. In addition in this investigation we will explore the Slope, and Y-Intercept of two lines, and explore the intersection of two lines using the CBR.

Equipment needed:

CBR (Calculator Based Ranger) Long link cable
TI-83 (or 82) CBR Clamp
Measuring strip

1. Load the RANGER program into one of the calculators in your group.
Note: You will need a large amount of free space on this calculator.



2. Collect your equipment and locate a place close to the FASST Center that has a clear and open space of about 5 meters long and 2 meters wide.
3. In the first part of this investigation we will be moving away from the CBR (going to Tulsa). Pick a person to be the “car” and mark off 4 meters from the CBR. Identify the point that is 1 meter from the CBR as the starting point.
4. Run the RANGER program and set up the CRB as shown below. In this part we will have 3 seconds to cove the distance from 1-meter, to the 4-meter mark (the 3 meters to Tulsa).



MAIN MENU
1: SETUP/SAMPLE
2: SET DEFAULTS
3: APPLICATIONS
4: PLOT MENU
5: TOOLS
6: QUIT

MAIN MENU	▶ START NOW
REALTIME:	NO
TIME(S):	3
DISPLAY:	DIST
BEGIN ON:	DELAY
SMOOTHING:	MEDIUM
UNITS:	METERS

- Collect the data, having the traveler moving at a constant speed over the distance. If the data (as you trace on the graph) covers the distance from 1 meters to 4 meters (for the Y-values) and this segment of the graph is a straight line, move to the next step. If you don't like this data, repeat the experiment.
- Now that you have "good" data for the trip **TO** Tulsa, use the Select Domain option to chop off the segment of the graph representing the actual trip (from 1 meters to 4 meters).
- If satisfied with this result, leave the program and explore the list in the List Editor. If you don't like the result, repeat the data collection, or "Get" the CBR data from the probe, if it is still in the CBR and Select the Domain again.
- Copy the two lists (**L₁** and **L₂**) into a named list for the Time to Tulsa (like **LTIME**), and the Distance to Tulsa (like **LDIST**).

TIME	DIST	----- 3
.25805	.97996	
.2903	1.0381	
.32256	1.0946	
.35482	1.1529	
.38707	1.2062	
.41933	1.2567	
.45158	1.299	
Name=		

- Make the initial time in the time list be zero by subtracting the 1st value in the list from the whole list **LTIME - LTIME(1)** distance. Now multiply this list by 100 (to make them into centiseconds) and round the values to no decimal places. **LTIME*100** and then **round(LTIME,0)**.

LTIME-LTIME(1)→L
TIME: LTIME*100→L
TIME: round(LTIME
,0)→LTIME

TIME	DIST	----- 1
0	.97996	
3	1.0381	
6	1.0946	
10	1.1529	
13	1.2062	
16	1.2567	
19	1.299	
TIME={0,3,6,10,1...		

10. Now multiply the values in the distance list by one hundred ($L\text{DIST} \times 100$) to make them into centimeters.

TIME	DIST	----- 2
0	.97996	
3	1.0381	
6	1.0946	
10	1.1529	
13	1.2062	
16	1.2567	
19	1.299	
DIST = LDIST * 100		

TIME	DIST	----- 2
0	97.996	
3	103.81	
6	109.46	
10	115.29	
13	120.62	
16	125.67	
19	129.9	
DIST(1) = 97.9961		

11. Share these two lists with everyone in the group. Save them, and protect them. If you are on a TI-82, these lists need to be placed in a program to store lists, or moved to the computer for safe keeping.
12. Repeat the experiment now, returning from Tulsa at a more leisurely pace (cover the distance from 4 meters to 1 meters in 6 seconds). Set the CBR up as before, using 6 seconds instead of 3 seconds.
13. Start at the 4-meter mark and move to the 1-meter mark in the allotted time. If your graph has the qualities listed in step 5, continue. If not, repeat the experiment.
14. Select the Domain as before, collect the segment from the 4-meter mark to the 1-meter mark (for the Y-values).
15. Leave the RANGER program and go to the List Editor as before. Copy the list for time and distance “**FROM Tulsa**” to two new named lists.
16. Modify the Time list as before (making the first time zero). Multiply the distance list by 100 as before.
17. Share these two new lists with all your team members.
18. Set up a Scatter Plot of both sets of lists. Turn in the four “clean” lists and this Plot with the WINDOW, to finish Part I. Keep the data to do Part II.

