

ALGEBRA I ACTIVITY 4: FINDING A LINE OF BEST FIT

ACTIVITY OVERVIEW:

In this activity we will

- Create a scatterplot representing resting heart rates versus age
- Graph vertical and horizontal lines to show Q1 and Q3 for both the ages and the heart rates
- Use the vertices of the Q1 and Q3 lines to calculate a line of best fit and graph it

```

3000 CALC TESTS
1:Edit...
2:SortA(
3:SortD(
4:ClrList
5:SetUpEditor
  
```

Press **S** (see screen above). Press **e**. Press **:** to the top of **L1** and then right arrow to the top of the seventh list which has no heading. The calculator will be in Alpha Mode, so type the heading **AGE**. Right arrow to an eighth list and type the heading **RHR** (for resting heart rate). Enter the 21 data points shown in the screens below.

L6	AGE	RHR	?
-----			-----
AGE(1) =			

L6	AGE	RHR	?
-----	10	90	
	10	93	
	12	89	
	17	81	
	19	85	
	23	80	
	25	78	
AGE(?) = 26			

L6	AGE	RHR	?
	26	75	
	28	77	
	31	80	
	37	75	
	31	76	
	35	75	
	37	69	
AGE(14) = 37			

L6	AGE	RHR	?
	45	68	
	42	64	
	48	64	
	46	61	
	51	64	
	53	62	
	55	70	
AGE(21) = 55			

Press **2nd** **Y=** for the **Stat Plots** menu. Press **e** to select **Plot 1**.

```

5:STAT PLOTS
1:Plot1...Off
  [ ] L1 L2 [ ]
2:Plot2...Off
  [ ] L1 L2 [ ]
3:Plot3...Off
  [ ] L1 L2 [ ]
4:PlotsOff
  
```

Press **e** to turn the plot on. Down arrow to **Xlist**.

```

Plot1 Plot2 Plot3
[ ] Off
Type: [ ] [ ] [ ]
      [ ] [ ] [ ]
Xlist:L1
Ylist:L2
Mark: [ ] + .
  
```

Press 2nd S to access the lists. Down arrow to the **AGE** list and press e . This will paste **AGE** in as the **Xlist**.

```

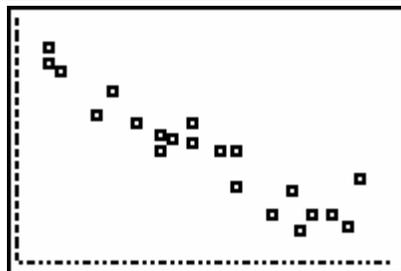
NAME OPS MATH
3: L3
4: L4
5: L5
6: L6
7: AGE
8: RESID
9: RHR
  
```

Down arrow to **Ylist** and repeat the process to select **RHR**.

```

Plot1 Plot2 Plot3
Off
Type: [ ] [ ] [ ]
Xlist: AGE
Ylist: RHR
Mark: [ ] + .
  
```

Press # 9 (or ZoomStat) to automatically set a window based on the data in your lists).



To find Q1 and Q3 for both the ages and the resting heart rates follow these steps. Press S $>$ e to select **1: 1-Var Stats**. This pastes the command on the home screen. Press 2nd S and scroll down to select the **AGE** list. Press e e .

```

1-Var Stats LAGE
  
```

Press the down arrow to find the five number summary, including Q1 and Q3 of the ages. Record these numbers.

```

1-Var Stats
fn=21
minX=10
Q1=21
Med=31
Q3=45.5
maxX=55
  
```

Repeat the process to find Q1 and Q3 for the heart rates.

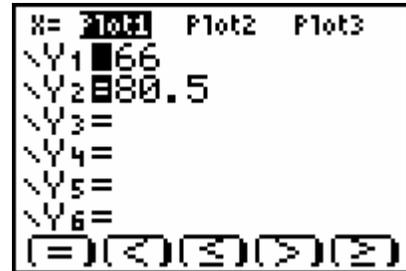
```

1-Var Stats
fn=21
minX=61
Q1=66
Med=75
Q3=80.5
maxX=93
  
```

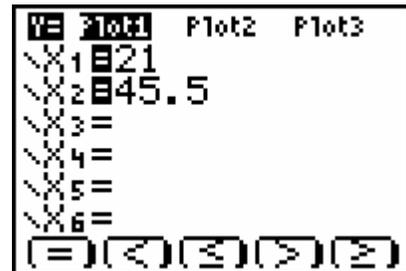
Press **A** . Select the Inequality Graphing APP (**INEQUALZ**). Press any key as directed. This will take you to a modified **Y=** screen. The five symbols along the bottom can be accessed by pressing **a** followed by the appropriate function key. To enter an inequality in terms of **x** arrow to the top (**X=**) and press **e** . There are no inequalities in this problem, but you will need to enter two vertical lines.



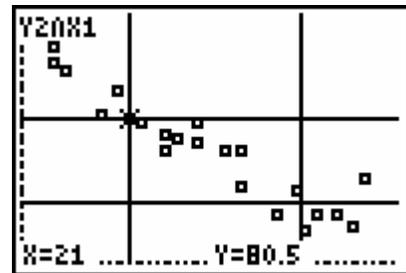
Type Q1 for the heart rates into **Y1** and Q3 for the heart rates into **Y2**.



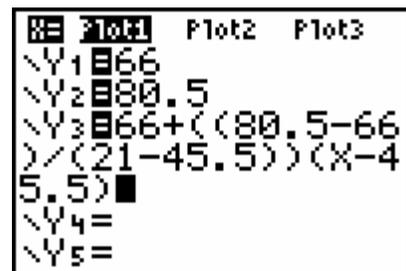
Arrow up to the top (**X=**) and press **e** . Type Q1 for the ages into **X1** and Q3 for the ages into **X2**.



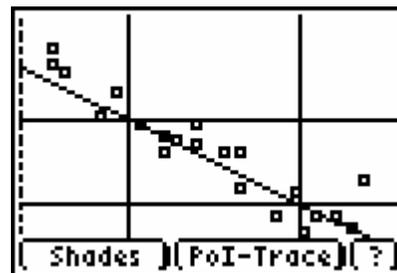
Press **%** to view the scatter plot with the Q1 and Q3 lines. Press **a** [F4] to find the intersections of these lines. Identify the diagonal across the center rectangle that follows the direction of the points. In the example, heart rate decreases as age increases, so the diagonal will connect (21, 80.5) to (45.5, 66).



Use the two points to write the equation for the line that will form the diagonal using the point-slope form. Type the equation into **Y3**.



Press $\%$ to view the line of fit. Discuss how this line compares to lines of fit found using other methods.



To turn off the Inequality Graphing APP, press A . Select **INEQUALZ**. You will be given the screen shown. Select **2: Quit Inequal**.

```
INEQUAL RUNNING
1: Continue
2: Quit Inequal
3: About
```