

The Line of Best Fit

Date: _____

1) Students in Ms. M's grade 11 Math class conducted an experiment to determine if marks scored on a test were related to the number of hours of television watched the night before.

Student	A	B	C	D	E	F	G	H	I	J
Mark (%)	82	64	84	70	74	76	85	73	94	90
Hours of TV	2	4	0	3	2	2	1	3	1	2

- a) Create a scatter plot for this data on your graphing calculator.
- b) Determine an equation for your line. _____
- c) How would you describe the relationship between hours of TV watched and test score?
- d) Use the line of best fit to determine the mark of a student who watches:
 - i) 2.5 hours of TV.
 - ii) 7 hours of TV.

2) This table shows the sales of bottled water at one refreshment booth at the Canadian National Exhibition in Toronto for different days during a heat wave one summer.

Temp (°C)	23	25	28	29	24	28	27	30	32	35	35	37	36	37
Bottles Sold	96	150	336	441	579	669	936	1128	858	750	1071	1092	963	998

- a) Determine the equation of the line of best fit.
- b) Predict how many bottles of water will be sold on a day when the temperature reaches:
 - i) 25°C
 - ii) 42°C
- c) Based on your line of best fit, what was the temperature on a day when 852 bottles of water were sold?

3) A basketball coach recorded the length of time each player played and how many points the player scored in one game.

Time (min)	20	5	10	18	15	14	15
Points Scored	12	2	4	14	8	6	7

a) Determine the equation of the line of best fit.

b) Shelley's data is not recorded, but she scores 9 points. Estimate how long she played.

c) Predict the number points she would score if she played for 25 minutes.

4) Doctors measured the ages, x , in months, and the heights, y , in centimetres, of a sample of baby boys. The results are recorded in the chart below.

Age (months)	0	15	18	9	1	3	6	10
Height (cm)	56	84	85	76	54	46	70	66

a) Use your graphing calculator to make a scatter plot of the data.

b) Determine the equation of the line of best fit.

c) Use the equation of the line of best fit to determine the height of a 12-month-old boy.

d) Use the equation to predict the height of a five-year-old boy. Does it make sense to use the equation?

Note:

a) A line of best fit passes through as many points as possible, with the remaining points grouped equally above and below the line, and spread out along the line rather than concentrated at one end.

b) A line of best fit can be used to make predictions for values not actually recorded and plotted. When the prediction involves a point within the range of values of the independent variable, this is called _____. When the value of the independent variable falls outside the range of recorded data, it is called _____.

Line of Best Fit –Using TI83 Calculator

Step 1 – Enter the data

Select **STAT** --- then select **Edit**

Enter the data for L_1 and L_2

(If there is already data in L_1 , you may remove it by putting your cursor on the label L_1 and choose **CLEAR** and then **ENTER**)

Step 2 – Create a scatter plot

Make sure that you have cleared any functions under Y=

select **STAT PLOT** ---- select **Plot1**

you will see a new screen

select **On**

for Type, select the first graph (scatter)

for Xlist: make sure it says L_1

for Ylist: make sure it says L_2

for Mark select +

select **ZOOM**

select **9:ZOOM STAT**

You will see the scatter plot.

Step 3 – Determine the equation of the line of best fit and graph the line of best fit

select **STAT** - go across the top to the CALC menu

select **4: LinReg (ax + b)**

you will see LinReg(ax + b) on the screen

you must enter L_1 (above the digit 1)

then ,

then L_2 (above the digit 2)

then ,

then select **VARS**

go across to the Y-VARS menu

select **1:Function**

select **1:Y₁**

You should now see

LinReg(ax+b) L_1, L_2, Y_1

Now press **ENTER**

You will now see the equation of the

line of best fit

Select **GRAPH**

You will see the scatter plot and the line of best fit.

Step 4: Determining y, given x.

Press 2nd, trace (calculate), #1 (value)

Enter the required x value then enter.

Step 5: Determining x, given y.

Press trace. This will take you to the points that you have graphed.

Use either the up arrow or the down arrow to transfer to the line.

Cursor right or left until you read the given (or a close approximation of) the y-value.