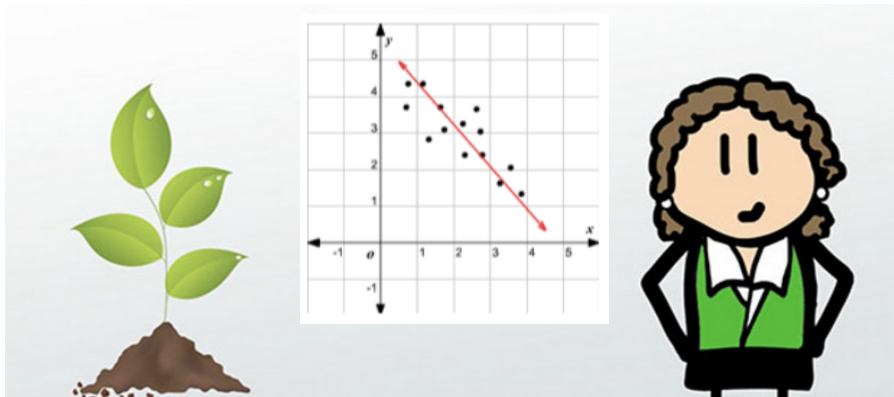


SEMINAR NOTES

Learning Guide 12

Interpreting Graphs



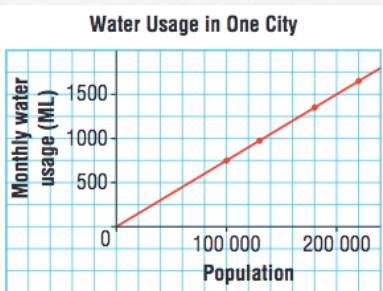
Using Graphs to Estimate Values

How do you think city planners can predict the volume of water that will be needed by its residents in the future?

- We can look at graphs to interpolate to estimate values. Interpolation is data gathered within the given data points.
- Or, we can look at graphs to extrapolate to estimate values. Extrapolation is data gathered outside the given data points using a ruler to extend the graph.

Ex.

Population	Monthly Water Usage (ML)
100 000	750
130 000	975
180 000	1350
220 000	1650



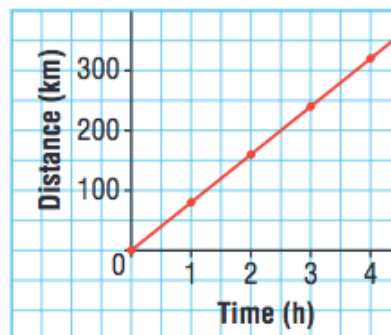
Use these data to:

- Estimate the monthly water usage for a population of 150 000 people.
- Estimate the population when the monthly water usage is 1400 ML.
- Predict the water usage for 250 000 people.

Practice:

This graph shows how the distance travelled by a car on the highway changes over a 4-h period.

- estimate the distance travelled in 1.5 h:
- estimate the time it takes to travel 300 km:
- estimate the time it takes to travel 450 km:



Determining Values from a Graph

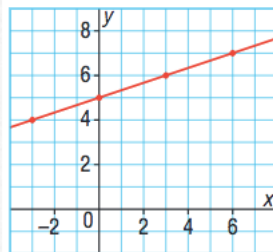
Use a graph of a linear relation to find values of variables.

- To find a given x value, locate the x value on the x -axis and then draw a vertical line up/down until you hit the graph. Then draw a horizontal line to the y -axis to get the answer.
- To find a given y value, locate the y value on the y -axis and then draw a horizontal line right/left until you hit the graph. Then draw a vertical line to the x -axis to get the answer.

Use this graph of a linear Relation to:

Ex.

Determine the value of y when $x = 3$



Ex.

Determine the value of x when $y = 5$

Practice: Use the graph above to:

a) Determine the value of y when $x = -3$

b) Determine the value of x when $y = 7$

Correlations

Ex.



A scatter plot shows a _____ correlation when the pattern rises up to the right.

Ex.



A scatter plot shows a _____ correlation when the pattern falls down to the right.

Ex.

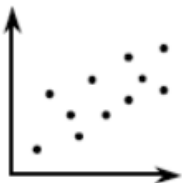


A scatter plot shows _____ correlation when no pattern appears.

Practice:

For each scatterplot, classify it as positive, negative or no correlation.

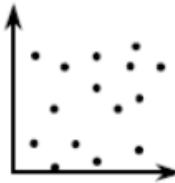
i.



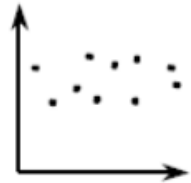
ii.



iii.



iv.

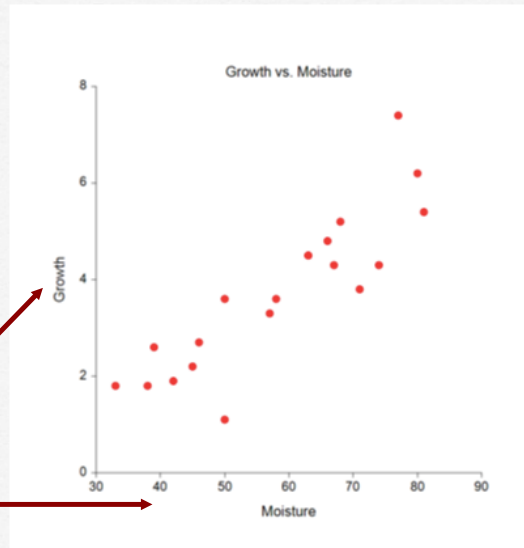


Scatter Plot

A Scatter Plot is a graph of paired data in which the data values are plotted as (x, y) coordinates.

Ex.

dependent variable (y-axis)
independent variable (x-axis)

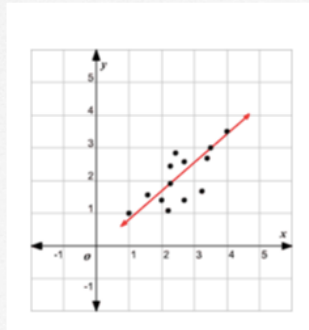


Best Fit Line

A **line of best fit** is a straight line drawn through as many points as possible with approximately the same number of points above the line as there are below the line.

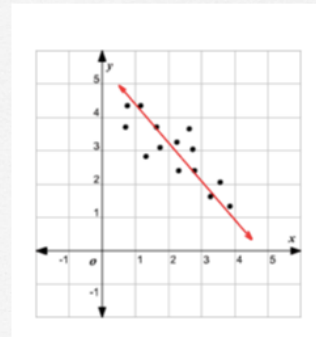
Ex.

Positive Correlation



Ex.

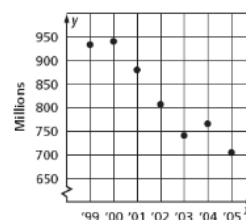
Negative Correlation



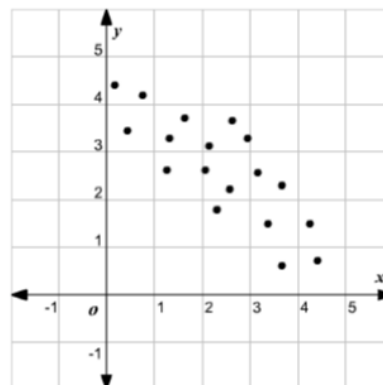
Drawing a Best Fit Line

Ex.

MUSIC The scatter plot shows the number of CDs (in millions) that were sold from 1999 to 2005. If the trend continued, about how many CDs were sold in 2006?



Practice: Draw the line of best fit for the given scatter plot.



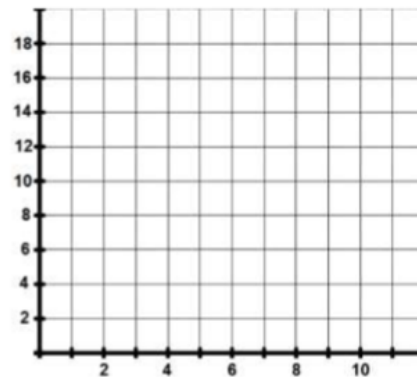
Drawing a Best Fit Line from Data

Ex.

What is the relationship between the amount of rainfall and the duration of time it rains?

a) Draw a scatter plot and a line of best fit for the data set below. Label the axes and include a title.

Time (hr)	Rainfall (mL)
1	5
2	2
3	6
4	7
5	4
6	8
7	9
8	12
9	10
10	13



b) Describe the trend

c) Describe the correlation

d) Describe the relationship

e) Use your line of best fit (LOBF) to determine the amount of rainfall at 6.5 hours. Show the dotted lines on the graph used to find your answer. Is this an example of interpolation or extrapolation?

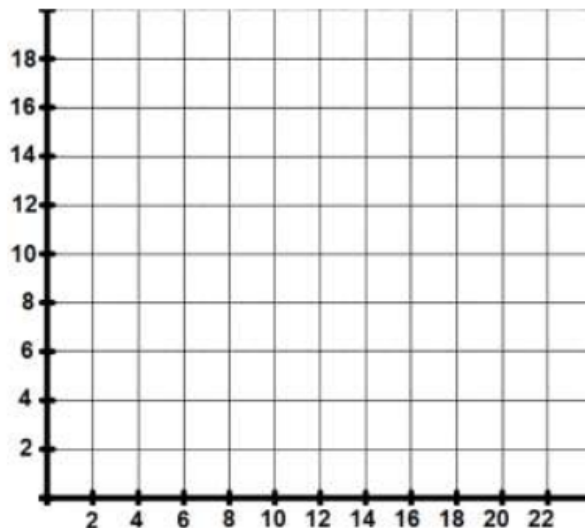
f) Use your LOBF to determine the number of hours it takes to have 14 mL of rain fall. Show the dotted lines on the graph used to find your prediction. Is this an example of interpolation or extrapolation?

Practice: *see next page*

What is the relationship between the price of a book in Canada compared to the price in the US?

a) Draw a scatter plot and a line of best fit for the data set below. Label the axes and include a title.

Book	Price (\$CAD)	Price (\$US)
The Far Side	18	13
Joy of Cooking	23	17
Chicken Soup	20	13
The Bike Book	16	12
Hoyles Rules	9	7
Field Guide	15	11
Romeo and Juliet	5	4



b) Describe the trend

c) Describe the correlation

d) Describe the relationship

e) Use your line of best fit (LOBF) to determine the price of a US book if it costs \$24 CAD

f) Is your answer to e) interpolation or extrapolation?

g) Use your LOBF to determine the price of a Canadian book if it costs \$2 US.

