

Statistics & Probability:

Transition from Junior Cycle to Senior Cycle

Workshop 2 Booklet

Name: _____



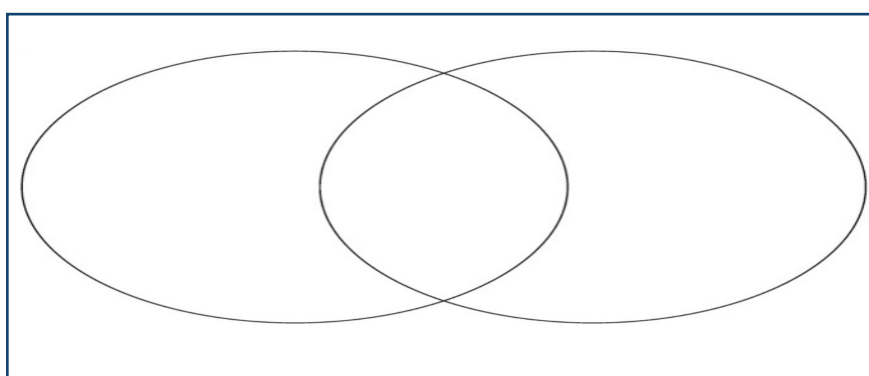
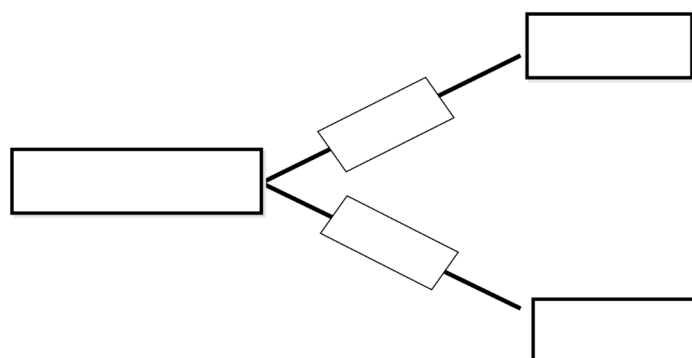
@ProjectMaths_ie

Syllabus Learning Outcome 1.2

Task 1.1 – Modelling the Data: Naughty or Nice

Santa has a naughty and nice list. Out of 100,000 people in 'Ballydahob', it was found that 0.1% of the people are on Santa's naughty list. Santa is 100% correct when drafting his list, he always checks it twice! His elves have created a new naughty alert app which is 99% accurate. A person will receive an alert to tell them which list they are on. You receive a text to say that you are on the naughty list. Should you be worried? Justify your reason.

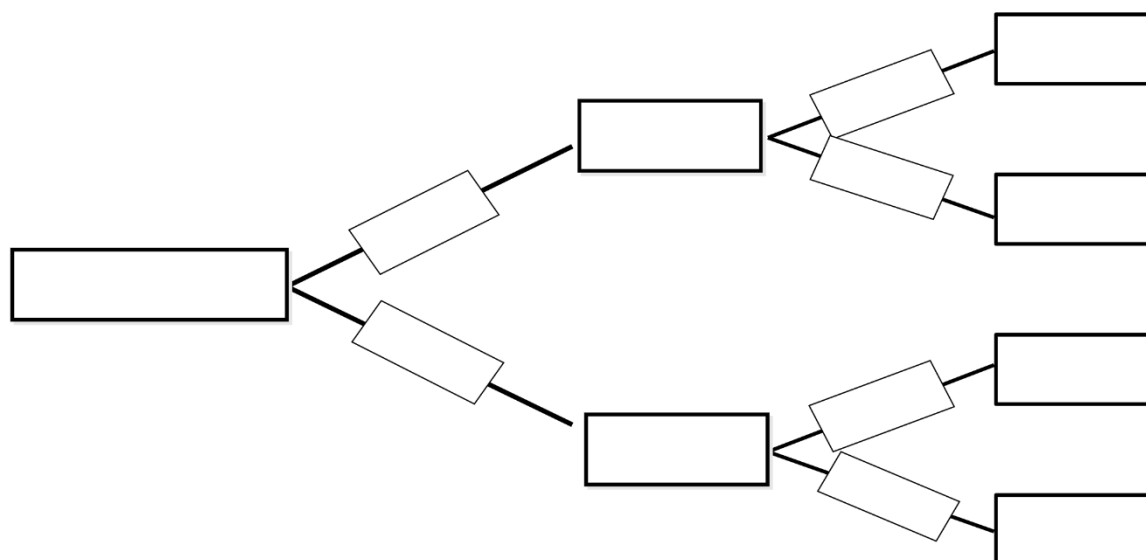




Using one of the representations, calculate the probability of a person chosen at random being on the naughty list.

Describe using words how you calculated this probability.

Task 1.2 – Modelling the Data: Using the App Tree Diagram



Two-way Table

Task 1.3 – Extension Questions

What is probability of someone picked at random being on the nice list?

What is probability of getting an incorrect alert?

Using words describe how you calculated this probability

Task 1.4 – Conditional Probability

What is the probability of getting a naughty alert given that you were naughty?

What is the probability of being naughty given that you received a naughty alert?

Syllabus Learning Outcome 1.7

Task 2.1 – Creating a Histogram in GeoGebra

A link to use the online version of GeoGebra with spreadsheet included:

<https://tinyurl.com/task2normal>

To use GeoGebra on own device, datasets can be found:

<https://tinyurl.com/normaldata>

1. In GeoGebra, open spreadsheet view. Enter 10 pieces of data, create a histogram (decrease column width)
2. Enter 50 more pieces, update histogram, enter 100, update
3. Repeat and discuss spread of distribution until all data is included
 - Think, pair, share
 - Discuss the shapes of varying distributions
4. Click on statistics button on histogram view (capital sigma) showing the mean and standard deviation
5. Questions: (Please choose the questions relevant to your dataset)

Height Data Set

- What is the probability of choosing a person with a height between 143.6 cm and 169.0 cm?
- What is the probability of choosing a person with a height between 130.9 cm and 181.7 cm?
- What is the probability of choosing a person with a height between 118.2 cm and 194.4 cm?

Foot Length Data Set (Using your Histogram)

- What is the probability of choosing a person with a foot length between 21.9 cm and 26.1 cm?
- What is the probability of choosing a person with a foot length between 19.9 cm and 28.1 cm?
- What is the probability of choosing a person with a foot length between 17.8 cm and 30.2 cm?

Arm Span Data Set

- What is the probability of choosing a person with an arm span between 107.4 cm and 122.4 cm?
- What is the probability of choosing a person with an arm span between 100.0 cm and 130.0 cm?
- What is the probability of choosing a person with an arm span between 92.3 cm and 137.5 cm?

Task 2.2 – How to Create a Histogram in GeoGebra

In View: Choose to open a Spreadsheet

Copy and paste data into the spreadsheet

Height
172
165
172
146
171
154
174
175
161
172

Use this data to create a Histogram

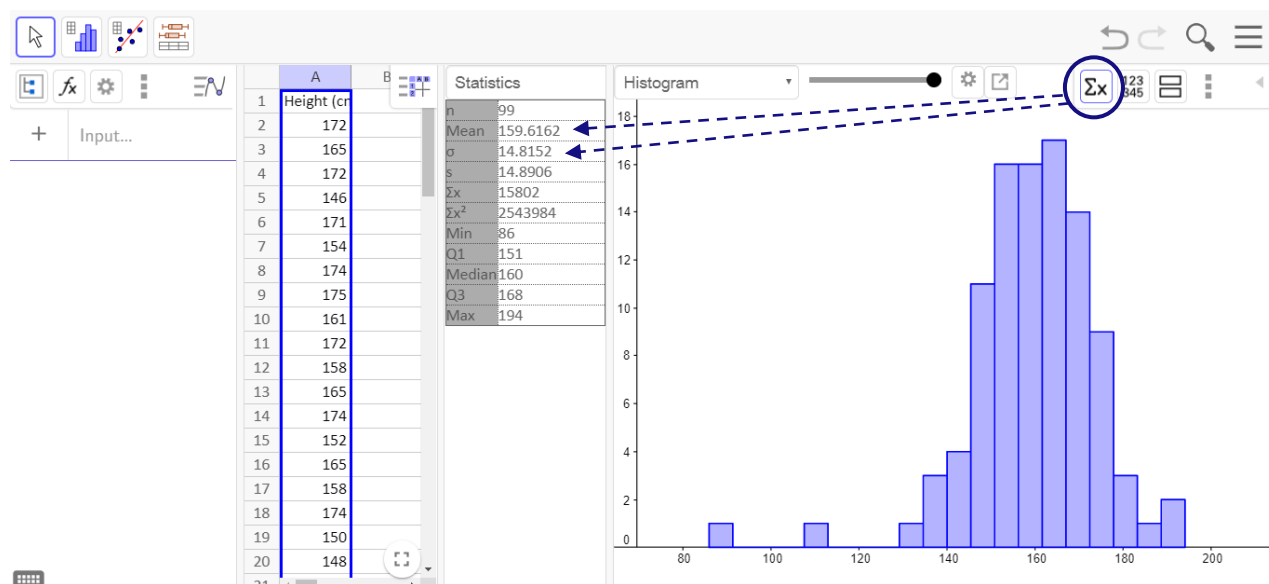
Choose the command for One Variable Analysis using the highlighted data

Choose to represent data using a histogram

Use slider to decrease & increase the width of the columns

Height
172
165
172
146
171
154
174
175
161
172

Using the Σx button, automatically calculate the statistics from your histogram



Syllabus Learning Outcome 1.6

Task 3.1 – Bivariate Relationships

(Teacher Hat)

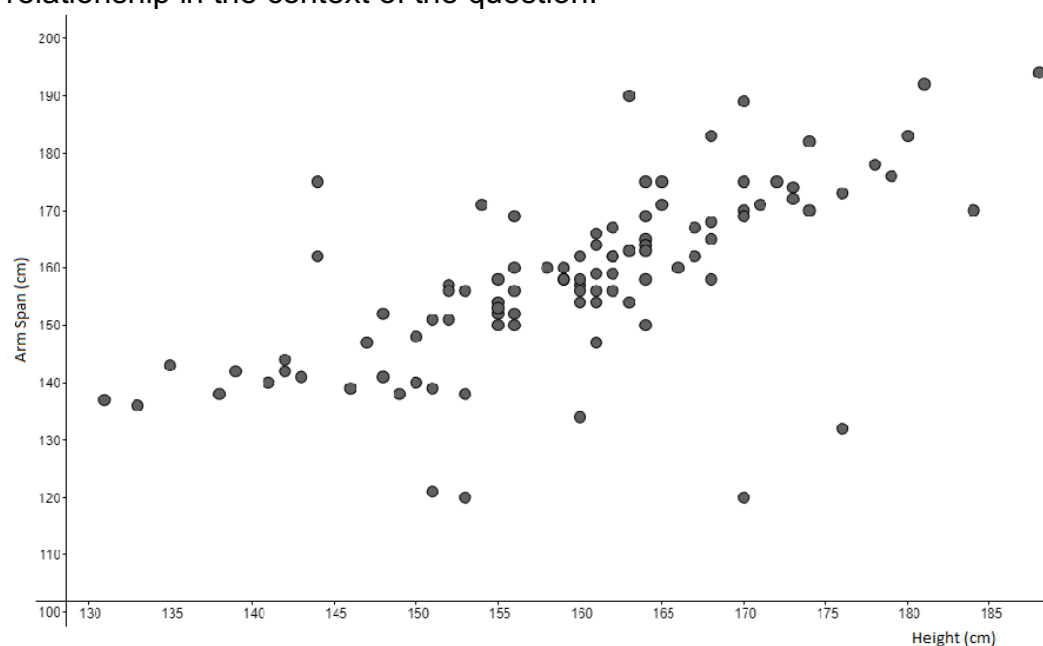
Student prior knowledge:

JC: Linear relationships from algebra/patterns. Coordinate geometry of the line.

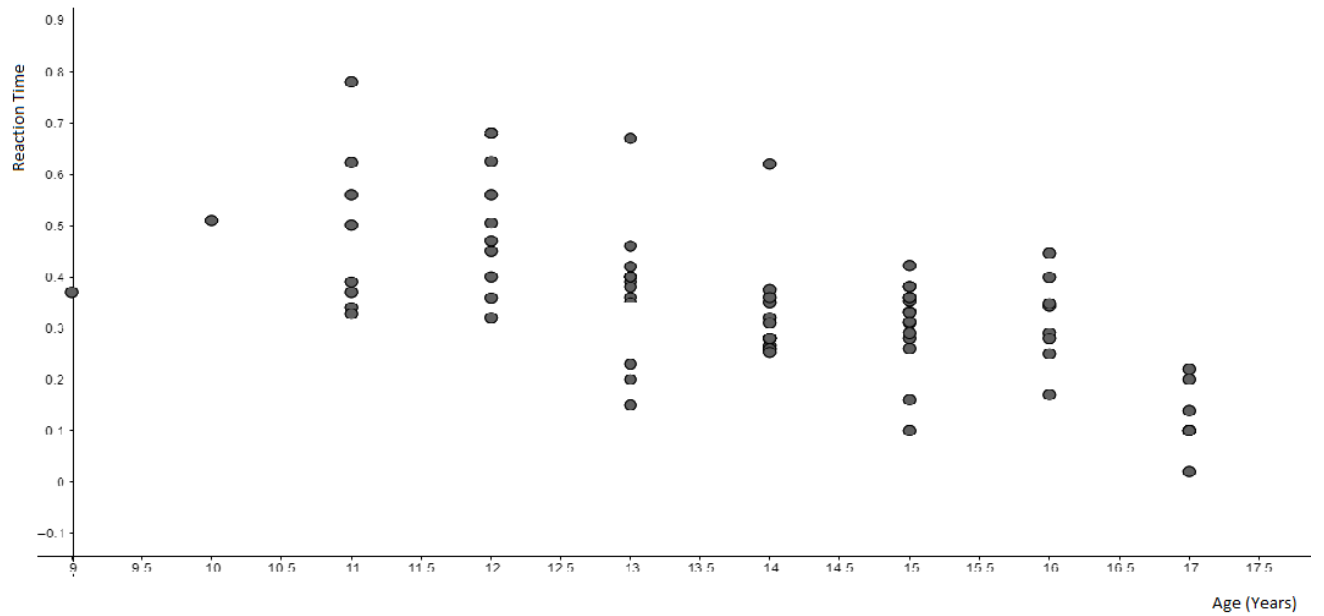
LC: Scatter plots.

(Student Hat)

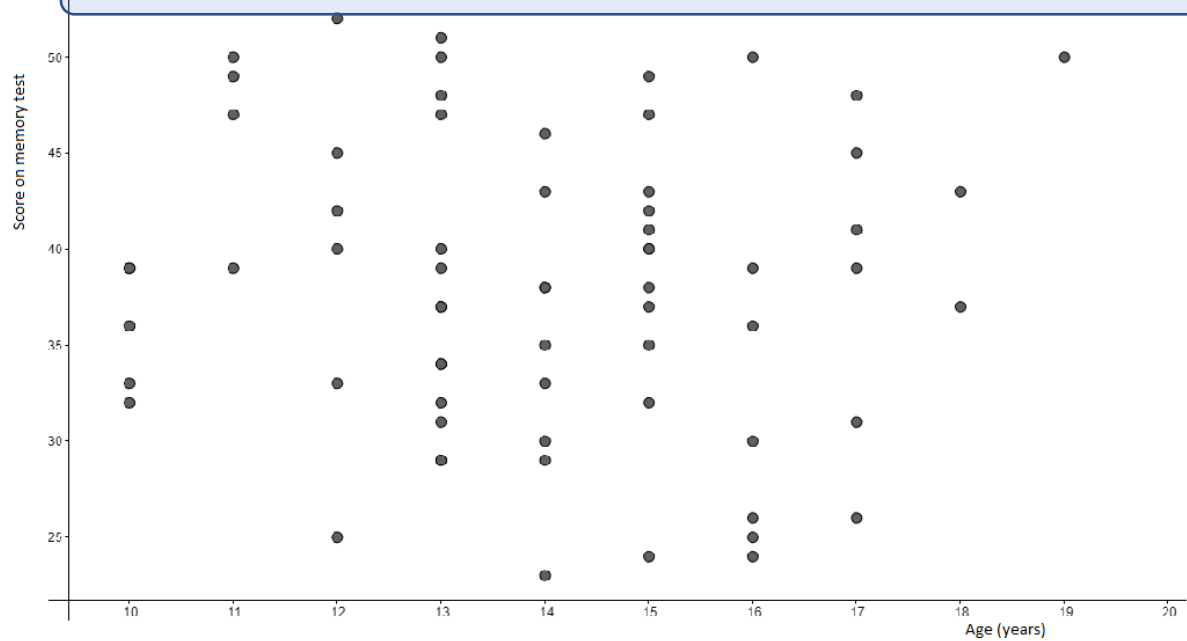
Q1. For each of the following diagrams, comment on the strength of each relationship in the context of the question.



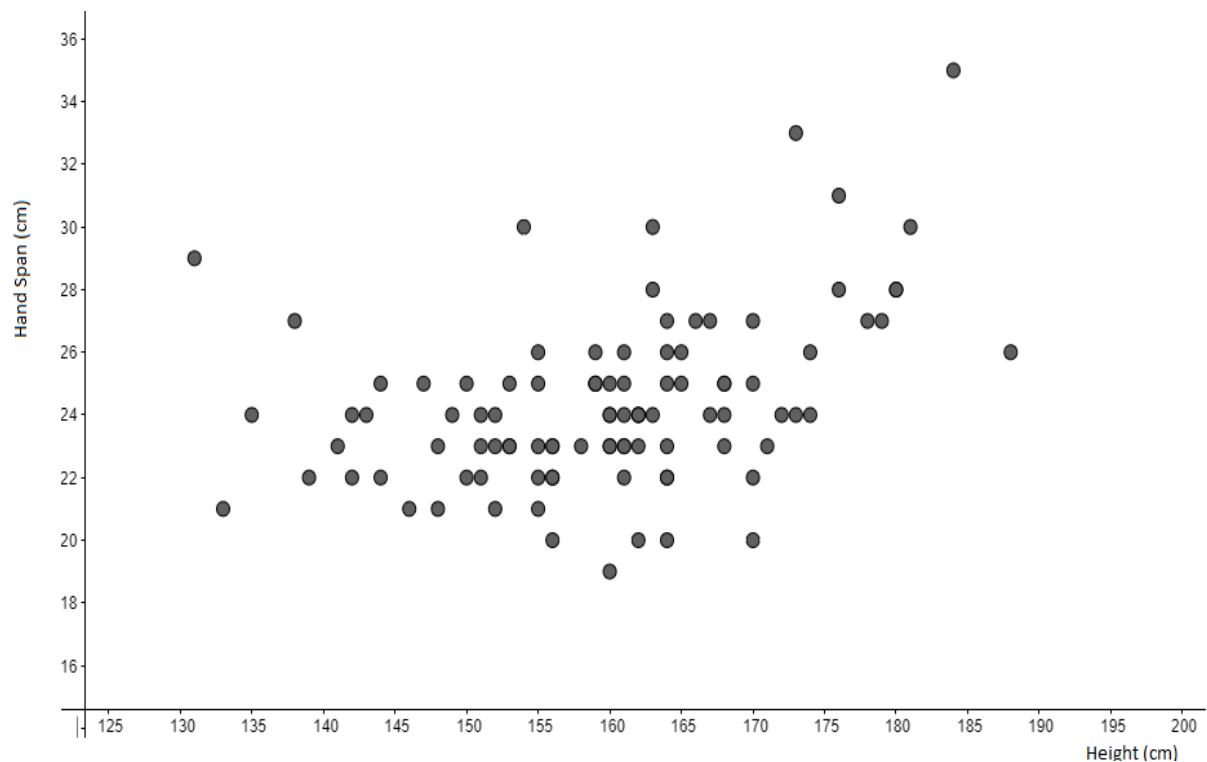
Comment:



Comment:



Comment:



Comment:

HW Task 3.2 – Task Review

(Teacher Hat)

Question: What was the purpose of this task?

If you were giving this task to your students list two effective questions that you would use to support their learning.

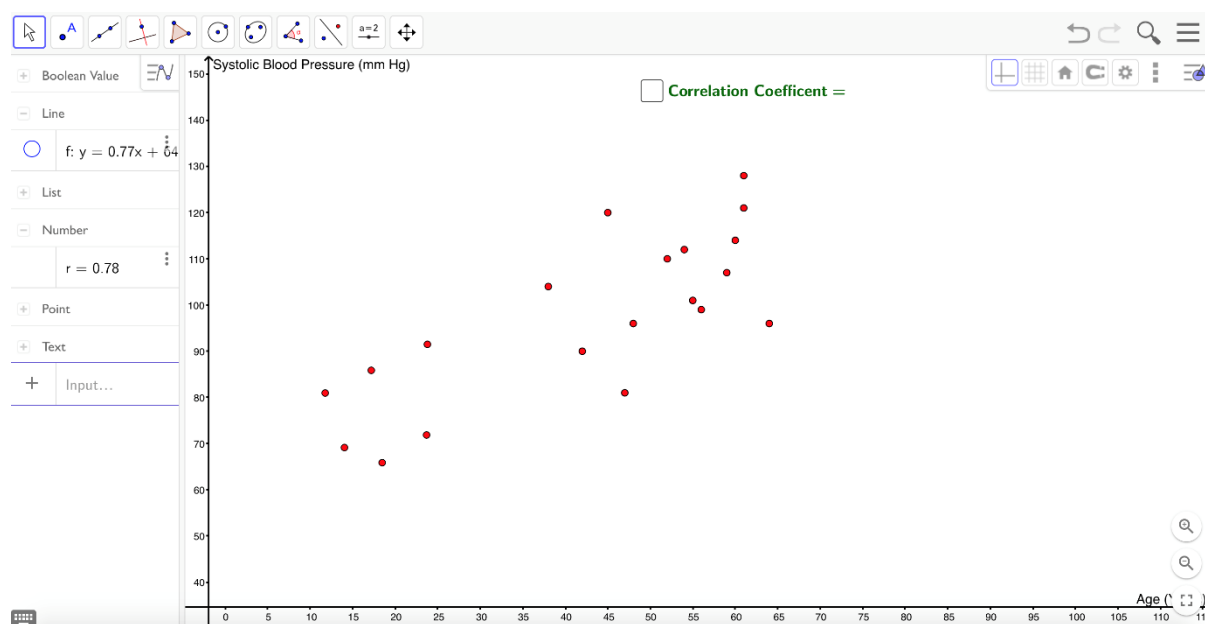
HW Task 3.3 – Correlation Coefficient

(Teacher Hat)

How do we differentiate between two 'strongly correlated' data sets? In addition to the language we have used to describe the relationships, we also have a mathematical value known as the correlation coefficient.

(Student Hat)

Log on to <https://tinyurl.com/WS2HW> to access the GeoGebra file.



Drag the points around and investigate the changes to the correlation coefficient. Note these observations in the box below.

Observations:

(Teacher Hat)

Students should observe max/min values and the significance of the sign of the correlation coefficient R .

If you were giving this task to your students list 2 effective questions that you would use to support their learning (refer to Bloom's Taxonomy).

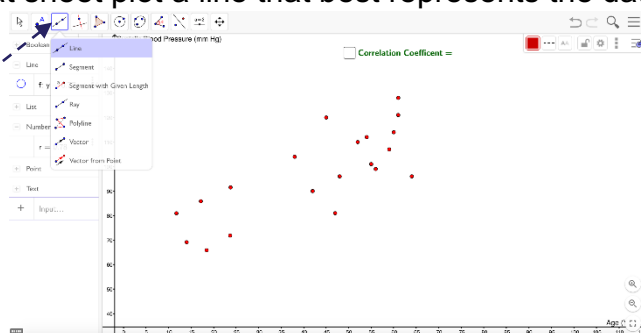
Effective questions relating to the correlation coefficient:

HW Task 3.4 – Line of Best Fit

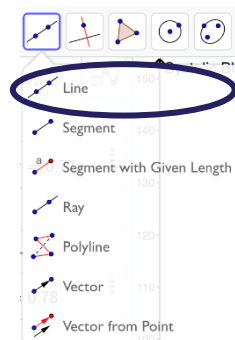
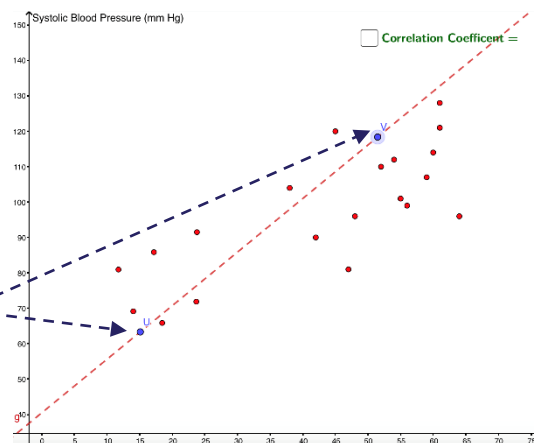
(Student Hat)

Using the cheat sheet plot a line that best represents the data.

Select the
line drop
down menu



Select two
points (new)
to position
your line

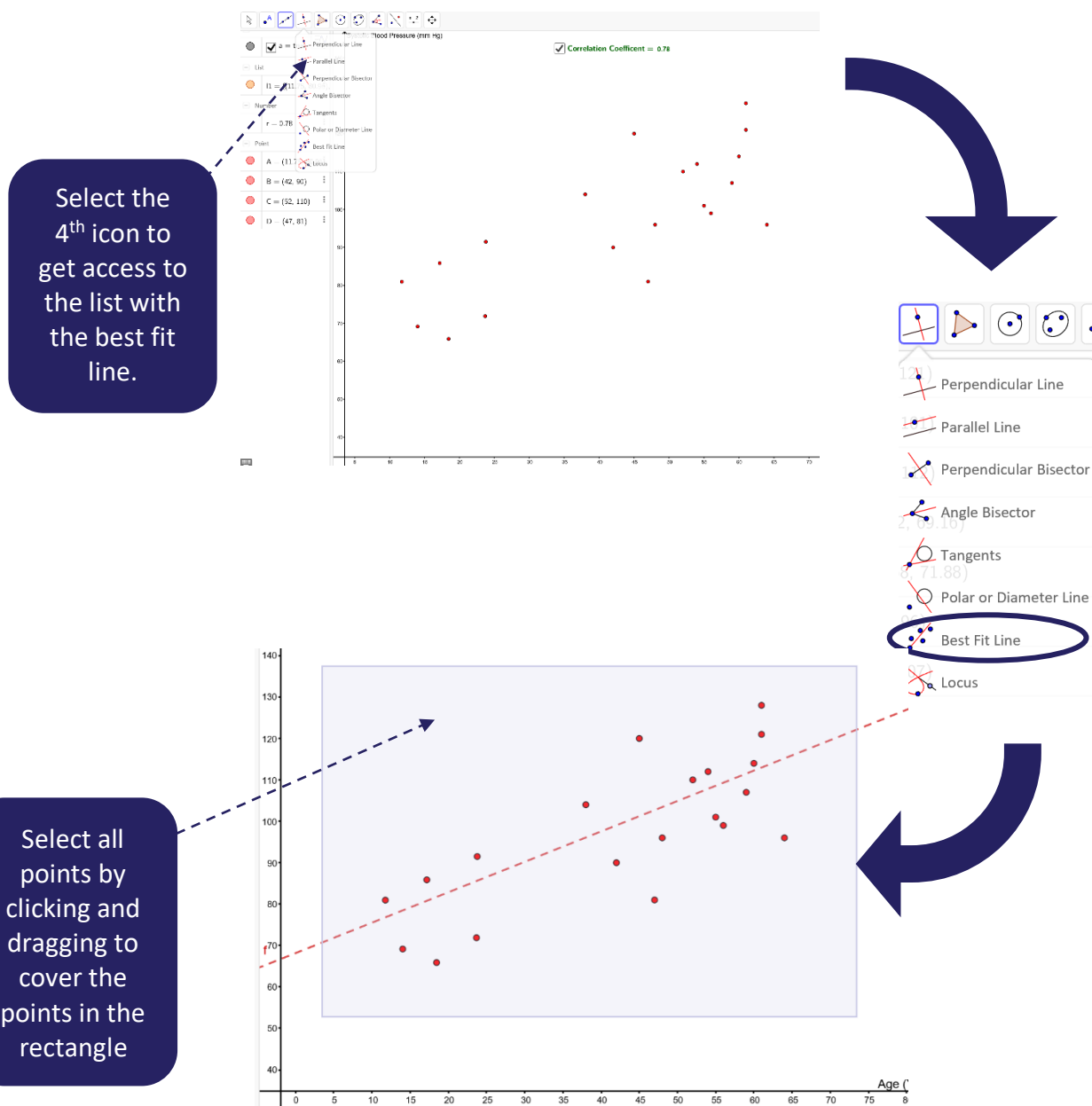


(Teacher Hat)

Use of effective questioning to explore why students would choose this positioning.

(Student Hat)

Then, using GeoGebra enter in the actual best fit line using the best fit line tool (see below). Note that the equation of this line shows up in the Algebra view. Drag the points and notice the effect on the line of best fit.



HW Task 3.5 – Suggested Extension Questions

(Teacher Hat)

Extension Questions:

Why is the 'line of best fit' a better representation of the strength of the relationship than your initial estimate line?

Is there any reason why two seemingly unrelated quantities can be strongly correlated? (Causation/lurking variables)

Can you predict what blood pressure a person of age ... would be?

Is there any situation where the slope of the line of best fit and the correlation coefficient are the same? Justify your answer.

HW Task 3.6 – Evaluation

Please complete the following evaluation of this task.

Google Form: <https://tinyurl.com/Task3Evaluation>

