



### Investigation 3.

In this investigation, you will implement the statistical investigation process to answer the question: is there an association between sleep and social media usage.

#### Step 1: Identify the problem and pose a statistical question

Is there an association between time spent on social media and sleep?

#### Step 2: Collect or obtain data

Survey 20 people and ask the following questions:

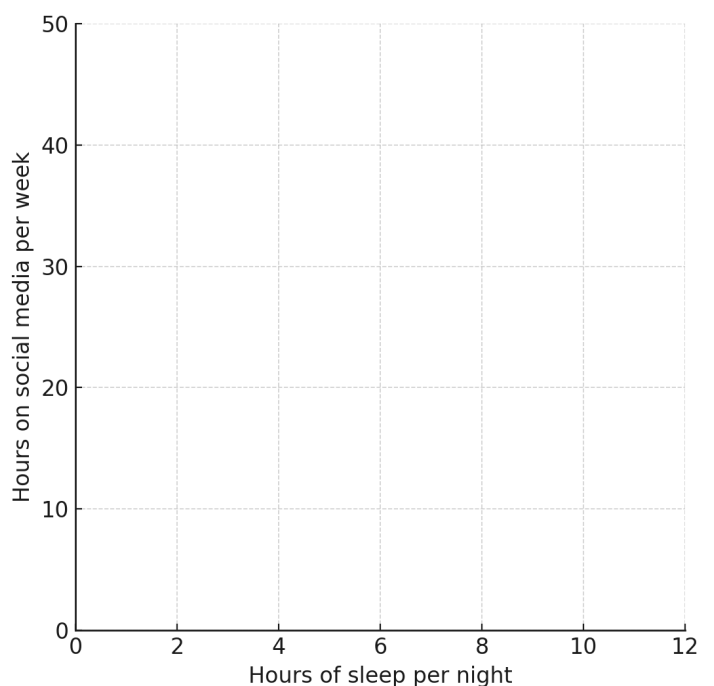
- How many hours sleep do you normally get per night on a weeknight?
- How many hours per week do you spend on social media?

Record your results in the table below:

Person #	Social media	Sleep	Person #	Social media	Sleep	Person #	Social media	Sleep
1			8			15		
2			9			16		
3			10			17		
4			11			18		
5			12			19		
6			13			20		
7			14					

#### Step 3: Organise and analyse the data

- Plot your data on the scatterplot.
- Put a line of best fit on your graph.
- Use two points from the line of best fit to find the equation of the line by hand.





### Investigation 3 (continued).

d. Describe the association in terms of direction, strength, and form.

e. Use your CAS calculator and the raw data (from step 2) to find the equation of the least squares line, correlation coefficient ( $r$ ), and coefficient of determination ( $r^2$ ).

f. Interpret the gradient and Y intercept in context.

g. Interpret the coefficient of determination ( $r^2$ ) found on your calculator.

*What percentage of the variation in social media use is explained by sleep hours?*

*What might explain the rest?*

h. Comment on interpolation vs extrapolation in the context of this data.



### **Investigation 3 (continued).**

#### **Step 4: Interpret the results**

Use the evidence from step 2 and 3 to comment on your findings.



### **Investigation 3 (continued).**

#### **Step 5: Communicate the findings**

Write a concise clear summary of your findings, summarising the investigation for someone who didn't read it. You should include:

- What the investigation was trying to figure out.
- A description of the data and association
- The equation of your line of best fit and what the gradient and intercept mean
- Your conclusions about strength, reliability, and limitations of the model
- A statement about causation