Name: _____

GCSE Statistics

Hypotheses

Total marks available: 28

Total marks achieved: _____

Instructions
• Use black ink or ball-point pen.
• Fill in the boxes at the top of this page with your name,
Centre number and candidate number.
• Answer all questions.
• Answer the questions in the spaces provided
– There may be more space than you need.
• Scientific calculators may be used.
• You must show all your working out with your answer clearly identified
At the end of your solution.

Information
• The marks for each question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice
• Read each question carefully before you start to answer it.
• Try to answer every question.
• Check your answers if you have time at the end.

Q1.

Ron wants to investigate the average summer temperature in European cities.
He thinks this will be affected by the height of the city above sea level.

He writes down two statements.

Statement A: Do cities which are higher above sea level have a lower summer temperature?

Statement B: The higher the city is above sea level the lower the summer temperature is.

(a) Statement A is **not** a hypothesis.

Explain why.

.....

.....

(1)

Ron uses Statement B as his hypothesis.

(b) Write down two variables Ron needs to use in his investigation.

Variable 1

.....

Variable 2

.....

(2)

(Total for question = 3 marks)

Q2.

Aneena wants to investigate whether the boys at her school do more exercise than the girls at her school.

Suggest a hypothesis Aneena could use.

.....

.....

(1)

(Total for question = 1 mark)

Q3.

The table shows information about ten films that each won the Best Picture Oscar award.

Year	Film Title	Runtime (minutes)	USA Box Office takings ($ thousands)	Worldwide Box Office takings ($ thousands)	IMDb rating
2016	Moonlight	111	27851	55561	7.5
2015	Spotlight	128	45056	91191	8.1
2014	Birdman	119	42341	103215	7.8
2013	12 Years a Slave	134	56672	187733	8.1
2012	Argo	120	136026	232326	7.7
2011	The Artist	100	44672	133433	7.9
2010	The King's Speech	118	138797	373700	8.0
2009	The Hurt Locker	131	17018	49231	7.6
2008	Slumdog Millionaire	120	141320	377911	8.0
2007	No Country for Old Men	122	74284	171627	8.1

(Source: *IMDb*)

Norman is investigating whether there is a relationship between the runtime of a film and the USA Box Office takings.

Write down a suitable hypothesis for this investigation.

.....

.....

(1)

(Total for question = 1 mark)

Q4.

A librarian wants to investigate, for books in her library, if there is a relationship between how old a book is and for how long it is borrowed.

(a) Suggest a hypothesis that the librarian could use.

.....

.....

(1)

(b) Write down the two variables the librarian should use for her investigation.

..... and
.....

(1)

(Total for question = 2 marks)

Q5.

Seb thinks that the number of medals won by a country in the Olympic Games is affected by the wealth of the country.

Suggest a hypothesis you could use to investigate this.

.....

.....

.....

(1)

(Total for question = 1 mark)

Q6.

Jean is investigating if students at her college buy more *ebooks* downloaded from the internet than books from shops.

Write down a hypothesis that Jean could use.

.....

.....

(1)

(Total for Question is 1 mark)

Q7.

A farmer is going to do an experiment to find out if using a new fertiliser will produce more wheat.

Write down a hypothesis he could use.

. . . .

. . . .

. . . .

. . . . . .

(1)

(Total for Question is 1 mark)

Q8.

A researcher is investigating how safe residents of different ages feel in their community at different times of the day.

Suggest a hypothesis the researcher can use.

.....

.....

(1)

(Total for Question = 1 mark)

Q9.

Zoe thinks the cost of a concert ticket depends on how long the concert lasts.

She investigates this for a sample of concerts during one year.

(a) Write down a hypothesis Zoe can use.

.....

.....

(1)

(b) Write down two variables Zoe needs to use.

Variable 1 .....

Variable 2 .....

(2)

(Total for question = 3 marks)

Q10.

Ruchi is investigating the relationship between an athlete's height and the time the athlete takes to run 100 metres.

Suggest a hypothesis she could use to investigate this.

.....

.....

(1)

(Total for question = 1 mark)

Q11.

Julie was investigating the relationship between the marks gained by students in their GCSE Mathematics exam and the marks gained by the same students in an A-level Mathematics exam.

Suggest a hypothesis Julie could use.

.....

.....

(1)

(Total for question = 1 mark)

Q12.

Reeta read a report that said that these days more 18 to 24 year olds find out what is happening in the news from social media than find out by watching TV.

She decided to investigate how the 12 000 students at her university find out what is happening in the news.

Reeta wrote the following as a hypothesis:

Do more students get their news from social media than from other sources?

Comment on whether it is appropriate to use this as a hypothesis.

.....

.....

(Total for question = 1 mark)

Q13.

Matthew is investigating how the cost of computer data storage has changed over time.

Suggest a hypothesis Matthew could use.

.....

.....

(Total for question = 1 mark)

Q14.

Youssef is investigating the amount of time students spend on social media.

Here is what Youssef has written down for his hypothesis and how he plans to collect, process and present his data.

Hypothesis

- Do girls spend more time than boys on social media?

Data to collect

- Gender of student
- Time spent on social media in one week (using categories: 1–2 hrs, 3–4 hrs, 5–6 hrs)
- Name of student

Processing and presenting data

- Work out an estimate of the mean weekly time boys spend on social media
- Work out an estimate of the mean weekly time girls spend on social media
- Draw a scatter graph with gender on the horizontal axis and time spent on social media on the vertical axis
- Draw a time series graph showing how the amount of time spent on social media has changed over the years

Discuss whether Youssef's hypothesis and his plans for collecting, processing and presenting his data are appropriate.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 5 marks)

Q15.

Anne is investigating the effect of caffeine on reaction times.

Here is what Anne has written down for her hypothesis and how she plans to collect, process and present her data.

Hypothesis

- Does caffeine reduce reaction times?

Data collection

- Pre-test the reaction time test
- Each person to complete the reaction time test, then drink some coffee, wait a while and then complete the reaction time test a second time
- Each person to record their reaction times in the spreadsheet

Processing and presenting data

- Look for outliers in the data and remove them if found
- Calculate the median and quartiles
- Draw a box plot for the reaction times after coffee has been drunk

Discuss whether Anne's hypothesis and her plans for collecting, processing and presenting data are appropriate.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for question = 5 marks)