statistics.

A Level Preparation Pack

Overview 🔍

A-level Statistics is taught within the Mathematics department at the College and we are looking forward to welcoming you in September. Statistics is both fascinating and increasingly important in a world where data collection and statistical analysis informs so much decision making, from testing new medical treatments to climate policy. With its real-life applications and links to many other subjects, interest in the A-level Statistics course has grown tremendously in recent years. To help you prepare for the transition to A-level study we have put together a range of resources to explore over the next few months. These will give you practice on important Statistics topics from GCSE Maths and will also provide a wider introduction to how Statistics is used in many different settings.

Activities ✏️

Here are some quick Statistics questions to try, which are all based on your knowledge of GCSE Maths.

1. A letter is chosen at random from the word STATISTICS. What is the probability that the letter chosen is T?

2. Sally asked 10 of her friends how many hours they spent watching TV per week. The results are as follows: 7   12   25   3   16   4   10   16   9   16
    Find the mode, median, mean and range for the number of hours Sally's friends spent watching TV per week.

3. The table below shows the probabilities of picking different coloured counters from a bag.
    a) Find the value of x   b) What is the probability of picking a red or green counter?

Colour	Red	Blue	Purple	Green	Yellow
Probability	0.2	0.13	0.08	0.27	x

4. Which of the following statements best matches each of the diagrams below?
    - A   Amount of rainfall and the number of sunbeds hired on a beach
    - B   The age of a house and the size of the garden
    - C   The age of a child and the height of a child

Diagram 1   Diagram 2   Diagram 3
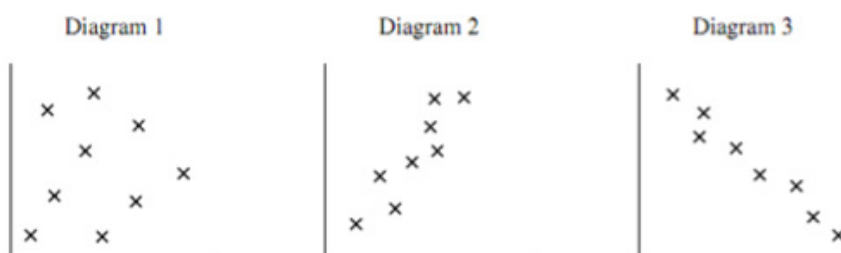
5. Find the value of the expression $x + z \dfrac{s}{\sqrt{n}}$ when x = 10.5 z = 1.96 s = 1.27   and n = 14

    Give your answer to 3 significant figures

Answers to all questions at the end of the next page.

Online Resources 🌐

Here are some further resources to help with the transition to A-level

https://www.bsfc.ac.uk/maths/statisticsprep – Booklets with questions and answers on a range of Statistics topics from GCSE Maths.

https://mathsisfun.com/data/ Explores a wide range of statistical concepts and topics, from GCSE level to more advanced A-level topics.

The Sixth Form College Birkenhead

Videos & Podcasts 📺

A selection of interesting videos and talks on Statistics:

- https://www.youtube.com/watch?v=xj1lx z790A – Statistics that will change how you think

- https://www.youtube.com/watch?v=sxYrzzy3cq8 – TED-Ed: How statistics can be misleading (Mark Liddell)

- https://www.youtube.com/watch?v=hVimVzgtD6w&feature=youtu.be – TED Talks: The best stats you've ever seen (Hans Rosling)

- https://www.bbc.co.uk/programmes/p06d1xw0 - More or Less: Behind the Stats (Podcast)

Suggested Reading 📖

There are many interesting books that explore Statistics for the general reader. Here are some to start with:

- 'The Art of Statistics: Learning from Data' by David Spiegelhalter: Popular introduction to how Statistics can help us understand the world, by one of the UK's leading statisticians.

- 'The Signal and the Noise' by Nate Silver: Explores the world of 'big data' and how it can be used to make predictions, and how to separate the true signal from the noise of random information.

- 'Lady Tasting Tea' by David Salsburg: At a summer tea party in Cambridge, England, a guest states that tea poured into milk tastes different from milk poured into tea. One man, Ronald Fisher, proposes to scientifically test the hypothesis.

Film & TV 📺

Here are some films & TV shows where Statistical ideas play a key role:

- Moneyball (2011) – Story of how Billy Beane used statistics to gain an advantage in assembling his baseball team.

- The Black Shell (2008) - Excellent short film, with a probability theme. An interesting scene explores the difficulty of winning the lottery!

- The Double (2013) - There's a short, funny scene supposedly using statistical inference to rule out or determine the identity of a murderer.

- 21 (2008) – A maths professor organizes some of his students into a team of blackjack players.

- Numb3rs (TV series) - Pilot episode uses statistics to track down the location of a criminal.

- The Stats of Life (2017) - Factual entertainment series that layers graphics of statistics over stories of real people.

Answers to activity:

1) $\frac{3}{10}$ 2) Mode = 16   Mean = 11.8   Median = 11   Range = 22   3a) 0.32 b) 0.47

4) A – Diagram 3   B – Diagram 1   C – Diagram 2   5) 11.2

Course Specifications ⬇

A Level - *Download Pearson Statistics Specification*

www.bsfc.ac.uk/newstarters