EXAM STRUCTURE

◆ The questions will be based on five distributions: Binomial, Poisson, Normal, Triangular and Rectangular. There will also be questions covering expectation algebra.

◆ You can expect a mix of calculation questions and explanation/justification questions, and a question that asks you to compare a theoretical and observed distribution.

BASIC THINGS TO KNOW

◆ Memorise the rules and assumptions for the Poisson and Binomial distributions, as well as how to recognise the normal, rectangular and triangular.

◆ Be able to interpret these words numerically – they often come up in questions:
  ❖ Exactly   =
  ❖ Up to   <
  ❖ More than >
  ❖ No more than ≤
  ❖ At most   ≤
  ❖ At least   ≥

◆ If you don't know what probability you're looking for, draw out a number line and mark the numbers you're looking for, e.g., "at least six events" would be:

  1 2 3 4 5 6 7 8

PUTTING ANSWERS IN CONTEXT

◆ Unlike most maths papers, in this one context is the most important thing. For most of the calculation questions, this means writing a little context sentence at the end of your answer. For example, if your final answer was 0.1, you could write "the probability of a chihuahua weighing more than 2kg is 0.1."

◆ For justification questions, put all of your points in context as well. For example, if you were explaining why you used the binomial, instead of just writing "Fixed number of trials", you should write something like "Fixed number of trials (10 coin flips)

CLASSIC QUESTIONS

◆ A calculation question might ask you to state any assumptions you made. If you're not sure what to write, a pretty safe bet is to say that you assumed that the events were independent – just make sure to put this in context!

◆ Some questions will combine two distributions. Usually this will mean you need to find a probability using

one of the five distributions, and then plug that probability into a Binomial distribution.

- ❖ For example, the first part of the question might get you to find the probability that a chihuahua weighs more than 2kg using the Normal distribution, and then the second part might ask you to find the probability that 3 out of 5 of the next adorable chihuahuas you see weigh more than 2kg, which would use the Binomial. Watch out for this in the exam!

- ◆ You'll probably be asked to compare a theoretical distribution with an observed distribution – that is, compare what would be expected with what actually happened.
  - ❖ You should start by calculating the expected probabilities and putting them on the graph or chart alongside the observed ones.
  - ❖ In your answer, compare the two distributions using **specific numbers**.
    Don't just write something like "the theoretical probability of getting 2 events is higher than the observed probability". Instead, write something more along the lines of "the theoretical probability of getting sunburnt 3 times last summer was 0.3, but the observed probability was only 0.1. This is a big difference, which suggests that the number of sunburns does not follow the theoretical distribution."
  - ❖ For a graph, you can also compare the centre, spread, shape and unusual features.

- ◆ Finally, you can also be given a question where you're given a probability and have to find the mean for a Poisson distribution.
  - ❖ Start by finding the probability that x = 0. Usually the question will give you the probability that **at least one** thing happens, so you'll need to take this probability away from 1 to find the probability of no events happening.
  - ❖ Plug this probability and x = 0 into the Poisson equation and solve!

HOW TO PREPARE

- ◆ If your class didn't spend much time on it, take some time to go through the Expectation Algebra section of your workbook or textbook to make sure you can use that section of your formula sheet confidently.
- ◆ Check out past exams and go through the marking schemes once you've done them to make sure you're writing answers in the right style. Try to write your own answers in a similar way to the exemplars to make sure you lock down those points on explanation questions!
- ◆ If you're studying from a textbook or workbook, make sure to practice doing questions that don't tell you what distribution to use. You need to practice identifying which one to use.
- ◆ Read through the StudyTime walkthrough guide and checklist to test yourself and consolidate your knowledge!