

Summary of Unit 8	Key Words
<p>Be able to use binomial and normal distributions to calculate probability</p> <p>Be able to calculate and use action and warning lines</p> <p>Understand how action and warning lines are used in context</p>	<p>Binomial distribution, normal distribution, probability, , bell shape curve, standard deviation, standardised scores, mean, median, range, warning lines, action lines,</p>

Level	Task Description
6	Understand and use notation $B(n, p)$ for binomial distribution Identify when a binomial distribution should be used, and the conditions needed
6-7	Calculate the probabilities using binomial distribution
6-7	Know and be able to use that the mean for a binomial distribution is found by np
7-8	Know the shape of a normal distribution Understand the notation $N(\mu, \sigma^2)$ Know the conditions that make the normal distribution suitable
7-8	Know how to draw two distribution curves on the same graph Calculate probabilities using standard deviations from a normal distribution (68%, 95% and 99.8%)
7-8	Use standardised scores to compare two samples of data
7-8	Understand the process of quality assurance and see why this is necessary in the real world
7-8	Calculate and use action and warning lines in quality assurance sampling applications Understand where data lies within action and warning lines



Diagnostic Test – Unit 8

1. A distribution Y is described as $B(8, 0.4)$
 - (a) What is this distribution called?
 - (b) What do the numbers 8 and 0.4 represent?

2. The probability that the bus from Dore to Hillsborough is late is 0.25. Oliver catches this bus 5 days a week.
 - (a) Expand $(p + q)^5$

 - (b) Calculate the probability that in one week,
 - (i) None of the buses are later
 - (ii) At least 3 of the buses are late

3. A new variety of chocolate eggs is manufactured with a new machine and each egg is automatically weighed as it passes through the process,

Any eggs with a mass less than 146g will be rejected. Assume the mass of the eggs can be modelled by a normal distribution with a mean 150g, and standard deviation 2g.

On the first day of production, there were 1600 eggs produced. Calculate how many of these you would expect to be rejected

4. Four students took the same test in English, Science and Maths. The table shows their marks in each test, the mean marks for each subject and the standard deviation.

	Nav	Andy	Johann	Kumaran	Mean	Standard Deviation
English	66	63	52	48	51	12
Science	43	46	51	67	40	6
Maths	82	58	65	73	55	8

- (a) Calculate the standardised scores for all the students in each test
- (b) Comment on each student performance in each test
- (c) Whose performance appears to have been the least consistent across the three tests? Explain your answer