

# Pearson Edexcel AS Mathematics 8MA0

## Statistics – Hypothesis Testing

Time allowed: 45 minutes

School: [www.CasperYC.club](http://www.CasperYC.club)

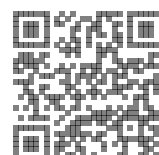
Name:

Teacher:

How I can achieve better:

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Question	Points	Score
1	6	
2	7	
3	6	
4	5	
5	8	
6	12	
7	6	
Total:	50	

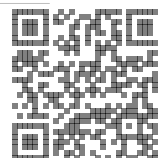


1. A company claims that a quarter of the bolts sent to them are faulty.

To test this claim the number of faulty bolts in a random sample of 50 is recorded.

- (a) Give two reasons why a binomial distribution may be a suitable model for the number of faulty bolts in the sample. [2]
- (b) Using a 5% significance level with the model of a binomial distribution, find the critical region for a 2-tail test of the hypothesis that the probability of a bolt being faulty is 0.25. [4]
- The probability of rejection in each tail should be less than 0.025.

Total: 6

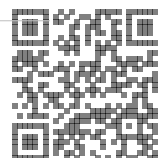


- A discrete random variable  $X$  has a binomial distribution  $B(30, p)$ .

(b) Under  $H_0 : X \sim B(30, 0.3)$ , using a 1% level of significance find the critical region of this test. You should state, to 2 significant figures, the probability of rejection. [3]

(c) Giving a reason, carefully state the outcome of the test. [2]

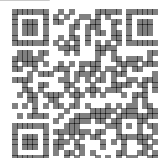
Total: 7



This observation is used to test  $H_0 : p = 0.3$  against  $H_1 : p \neq 0.3$ .

- The actual value of  $x$  obtained is 3.

- Total: 6



This observation is used to test  $H_0 : p = 0.37$  against  $H_1 : p > 0.37$ .

[3]

The actual value of  $x$  obtained is 17.

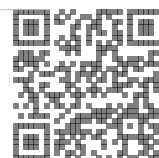
[2]

5. Linda regularly takes a taxi to work five times a week. Over a long period of time she finds the taxi is late once a week on average. The taxi firm changes her driver and Linda thinks the taxi is late more often. In the first week with the new driver the taxi is late 3 times. You may assume that the number of times the taxi is late in a week can be modelled with a binomial distribution.

(a) Test, at the 5% level of significance, whether or not there is evidence of an increase in the proportion of times the taxi is late. State your hypotheses clearly. [6]

(b) One of the assumptions when modelling using a binomial distribution is that the probability of success  $p$ , in this case the probability the taxi is late, is constant throughout all the trials. [2]  
Give two possible reasons why this assumption may not hold for this situation.

Total: 8



[6]

$$[1]$$

[5]

Total: 12

[6]