

AS STATISTICS PRACTICE 1

Question 1

A travel agent sells holidays from his shop. The price, in £, of 15 holidays sold on a particular day are shown below.

299	1050	2315	999	485
350	169	1015	650	830
99	2100	689	550	475

For these data, find

- (a) the mean and the standard deviation,

(3)

- (b) the median and the inter-quartile range.

(4)

An outlier is an observation that falls either more than $1.5 \times (\text{inter-quartile range})$ above the upper quartile or more than $1.5 \times (\text{inter-quartile range})$ below the lower quartile.

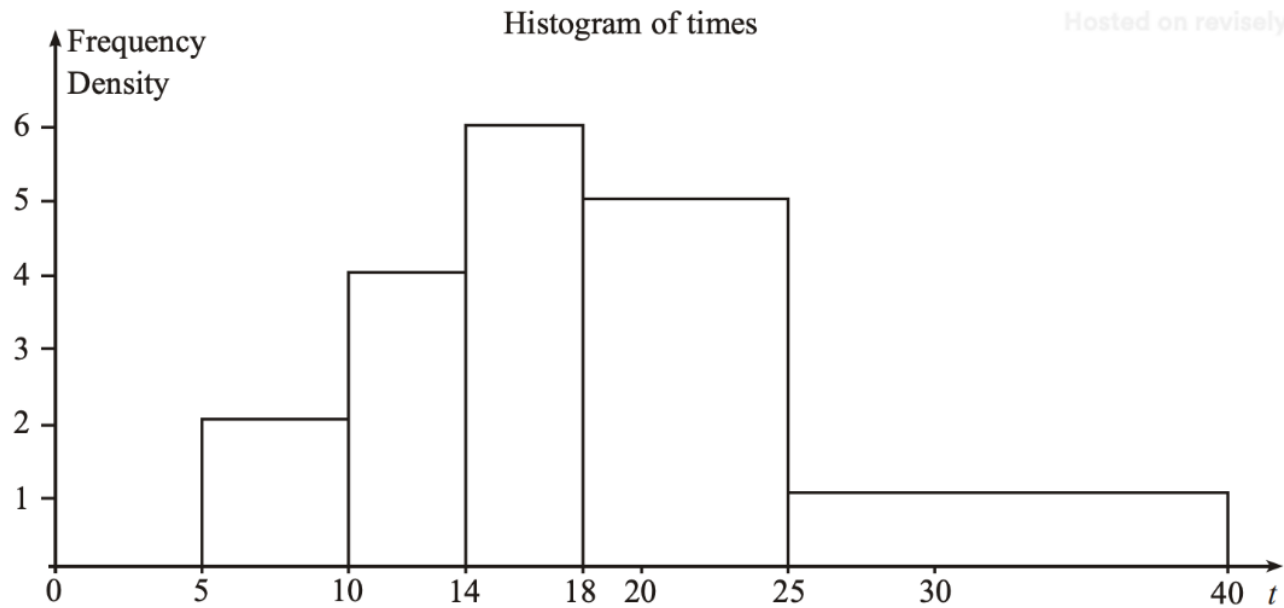
- (c) Determine if any of the prices are outliers.

(3)

- (e) Compare and contrast sales from the shop and sales from the website.

(2)

Question 2



The diagram above shows a histogram for the variable t which represents the time taken, in minutes, by a group of people to swim 500m.

(a) Complete the frequency table for t .

t	5–10	10–14	14–18	18–25	25–40
Frequency	10	16	24		

(2)

(b) Estimate the number of people who took longer than 20 minutes to swim 500m.

(2)

(c) Find an estimate of the mean time taken.

(4)

(d) Find an estimate for the standard deviation of t .

(3)

(e) Find the median and quartiles for t .

(4)

Question 3

A fairground game involves trying to hit a moving target with a gunshot. A round consists of up to 3 shots. Ten points are scored if a player hits the target, but the round is over if the player misses. Linda has a constant probability of 0.6 of hitting the target and shots are independent of one another.

- (a) Find the probability that Linda scores 30 points in a round.

(2)

The random variable X is the number of points Linda scores in a round.

- (b) Find the probability distribution of X .

(5)

- (c) Find the mean and the standard deviation of X .

(5)

A game consists of 2 rounds.

- (d) Find the probability that Linda scores more points in round 2 than in round 1.

(6)

Question 4

The events A and B are such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$.

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- (a) Using the space below, represent these probabilities in a Venn diagram.



(4)

Hence, or otherwise, find

- (b) $P(A \cup B)$,

(1)

- (c) $P(A \mid B')$

(2)

Question 5

For the events A and B ,

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$$P(A \cap B') = 0.32, \quad P(A' \cap B) = 0.11 \quad \text{and} \quad P(A \cup B) = 0.65$$

- (a) Draw a Venn diagram to illustrate the complete sample space for the events A and B . (3)

- (b) Write down the value of $P(A)$ and the value of $P(B)$. (3)

- (c) Find $P(A | B')$. (2)

- (d) Determine whether or not A and B are independent. (3)

Question 6

A drugs company claims that 75% of patients suffering from depression recover when treated with a new drug.

A random sample of 10 patients with depression is taken from a doctor's records.

- (a) Write down a suitable distribution to model the number of patients in this sample who recover when treated with the new drug.

(2)

Given that the claim is correct,

- (b) find the probability that the treatment will be successful for exactly 6 patients.

(2)

The doctor believes that the claim is incorrect and the percentage who will recover is lower. From her records she took a random sample of 20 patients who had been treated with the new drug. She found that 13 had recovered.

- (c) Stating your hypotheses clearly, test, at the 5% level of significance, the doctor's belief.

(6)

- (d) From a sample of size 20, find the greatest number of patients who need to recover from the test in part (c) to be significant at the 1% level.

(4)

Question 7

The probability of a bolt being faulty is 0.3. Find the probability that in a random sample of 20 bolts there are

(a) exactly 2 faulty bolts, (2)

(b) more than 3 faulty bolts. (2)

These bolts are sold in bags of 20. John buys 10 bags.

(c) Find the probability that exactly 6 of these bags contain more than 3 faulty bolts. (3)

Question 8

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. 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 a taxi is late in a week has a Binomial distribution.

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.

(Total 7 marks)

