

(a) Find the equation of the regression line of y on x in the form $y = a + bx$.

Give the values of a and b correct to 3 significant figures.

(4)

(b) Hence find the equation of the regression line of e on g in the form $e = c + dg$.

Give the values of c and d correct to 2 significant figures.

(4)

(c) Use your regression equation to estimate the number of units of electricity used in a week when 100 units of gas were used.

(2)





- | | | | |
|--------|-----|------|---|
| x | 1 | 2 | 3 |
| $F(x)$ | 0.4 | 0.65 | 1 |

- (3)

- (1)

1



3. An agriculturalist is studying the yields, y kg, from tomato plants. The data from a random sample of 70 tomato plants are summarised below.

(You may use $\sum fx = 755$ and $\sum fx^2 = 12037.5$)

The bar representing the yield $5 \leq y < 10$ has a width of 1.5 cm and a height of 8 cm.

- (a) Calculate the width and the height of the bar representing the yield $15 \leq y < 25$ (3)
- (b) Use linear interpolation to estimate the median yield of the tomato plants. (2)
- (c) Estimate the mean and the standard deviation of the yields of the tomato plants. (4)
- (d) Describe, giving a reason, the skewness of the data. (2)
- (e) Estimate the number of tomato plants in the sample that have a yield of more than 1 standard deviation above the mean. (2)





4. The time, in minutes, taken to fly from London to Malaga has a normal distribution with mean 150 minutes and standard deviation 10 minutes.

(a) Find the probability that the next flight from London to Malaga takes less than 145 minutes.

(3)

The time taken to fly from London to Berlin has a normal distribution with mean 100 minutes and standard deviation d minutes.

Given that 15% of the flights from London to Berlin take longer than 115 minutes,

(b) find the value of the standard deviation d .

(4)

The time, X minutes, taken to fly from London to another city has a normal distribution with mean μ minutes.

Given that $P(X < \mu - 15) = 0.35$

(c) find $P(X > \mu + 15 \mid X > \mu - 15)$.

(3)





$$\sum x = 60, \quad \sum y = 61, \quad \sum y^2 = 393, \quad \sum xy = 382, \quad S_{xx} = 28$$

- The researcher decides to add a child with family name “Turner” to the sample.

- Given that the addition of the child with family name “Turner” to the sample leads to an increase in S_{vv}

- (e) use the definition $S_{xy} = \sum (x - \bar{x})(y - \bar{y})$ to determine whether or not the value of r will increase, decrease or stay the same. Give a reason for your answer. (2)



6.

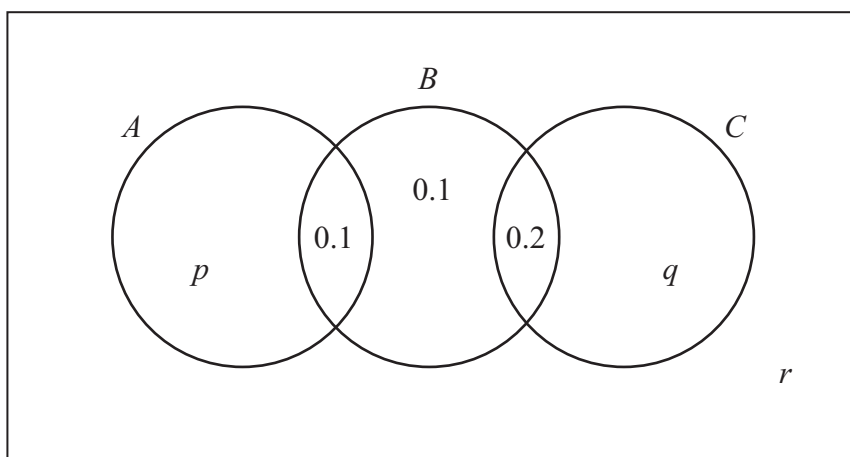


Figure 1

The Venn diagram in Figure 1 shows three events A , B and C and the probabilities associated with each region of B . The constants p , q and r each represent probabilities associated with the three separate regions outside B .

The events A and B are independent.

- (a) Find the value of p .

(3)

Given that $P(B|C) = \frac{5}{11}$

- (b) find the value of q and the value of r .

(4)

- (c) Find $P(A \cup C | B)$.

(2)





Question 7 continued

(Total 18 marks)

Q7

TOTAL FOR PAPER: 75 MARKS

END

