

Solomon Practice Paper

Statistics S1 – L

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	7	
2	8	
3	10	
4	11	
5	12	
6	12	
7	15	
Total:	75	

How I can achieve better:

-
-
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Last updated:

July 14, 2025



1. A shop recorded the number of pairs of gloves, n , that it sold and the average daytime temperature, T° , for each month over a 12-month period. The data was then summarised as follows:

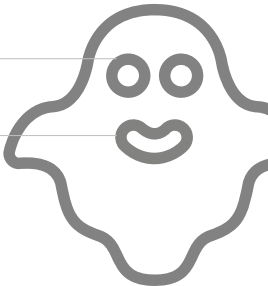
$$\sum T = 124, \quad \sum n = 384, \quad \sum T^2 = 1802, \quad \sum n^2 = 18518, \quad \sum Tn = 2583.$$

- (a) Calculate the product moment correlation coefficient for these data.

[5]
- (b) Comment on what your value shows and suggest a reason for this.

[2]

Total: 7



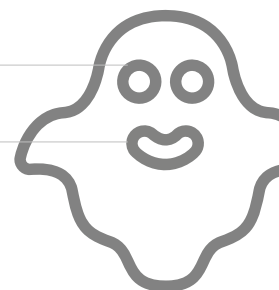
2. Events A and B are independent. Given also that

$$\Pr(A) = \frac{3}{4} \quad \text{and} \quad \Pr(A \cap B') = \frac{1}{4}.$$

Find

- (a) $\Pr(A \cap B)$, [2]
- (b) $\Pr(B)$, [3]
- (c) $\Pr(A' \cap B')$. [3]

Total: 8



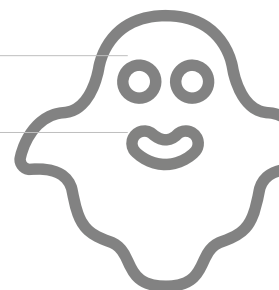
3. The random variable X is such that

$$E(X) = a \quad \text{and} \quad \text{Var}(X) = b.$$

Find expressions in terms of a and b for

- (a) $E(2X + 3)$, [1]
- (b) $\text{Var}(2X + 3)$, [2]
- (c) $E(X^2)$. [3]
- (d) Show that $E[(X + 1)^2] = (a + 1)^2 + b$. [4]

Total: 10

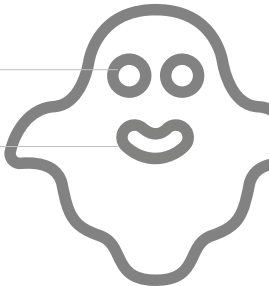


4. An engineer tested a new material under extreme conditions in a wind tunnel. He recorded the number of microfractures, n , that formed and the wind speed, v metres per second, for 8 different values of v with all other conditions remaining constant. He then coded the data using $x = v - 700$ and $y = n - 20$ and calculated the following summary statistics.

$$\sum x = 100, \quad \sum y = 23, \quad \sum x^2 = 215000, \quad \sum xy = 11600.$$

- (a) Find an equation of the regression line of y on x . [7]
- (b) Hence, find an equation of the regression line of n on v . [2]
- (c) Use your regression line to estimate the number of microfractures that would be formed if the material was tested in a wind speed of 900 metres per second with all other conditions remaining constant. [2]

Total: 11



- | Value of goods stolen £ | (Number of weeks) |
|-------------------------|---------------------|
| 0 – 199 | 31 |
| 200 – 399 | 6 |
| 400 – 599 | 3 |
| 600 – 799 | 4 |
| 800 – 999 | 5 |
| 1000 – 1999 | 2 |
| 2000 – 2999 | 1 |

(a) find $\sum fy$. [3]

- (c) Explain why the manager of the shop might be reluctant to use either the mean or the median in summarising these data. [3]

6. At the start of a gameshow there are 10 contestants of which 6 are female. In each round of the game, one contestant is eliminated. All of the contestants have the same chance of progressing to the next round each time.
- (a) Show that the probability that the first two contestants to be eliminated are both male is $\frac{2}{15}$. [3]
 - (b) Find the probability that more females than males are eliminated in the first three rounds of the game. [6]
 - (c) Given that the first contestant to be eliminated is male, find the probability that the next two contestants to be eliminated are both female. [3]

Total: 12



7. A cyber-cafe recorded how long each user stayed during one day giving the following results.

Length of stay (minutes)	0 –	30 –	60 –	90 –	120 –	240 –	360 –
Number of users	15	31	32	23	17	2	0

(a) Use linear interpolation to estimate the median and quartiles of these data.

[6]

The results of a previous study had led to the suggestion that the length of time each user stays can be modelled by a normal distribution with a mean of 72 minutes and a standard deviation of 48 minutes.

(b) Find the median and quartiles that this model would predict.

[7]

(c) Comment on the suitability of the suggested model in the light of the new results.

[2]

Total: 15

