

5. The number of goals scored by a football team is recorded for 100 games. The results are summarised in Table 1 below.

Number of goals	Frequency
0	40
1	33
2	14
3	8
4	5

Table 1

- (a) Calculate the mean number of goals scored per game.

(2)

The manager claimed that the number of goals scored per match follows a Poisson distribution. He used the answer in part (a) to calculate the expected frequencies given in Table 2.

Number of goals	Expected Frequency
0	34.994
1	r
2	s
3	6.752
≥ 4	2.221

Table 2

- (b) Find the value of r and the value of s giving your answers to 3 decimal places.

(3)

- (c) Stating your hypotheses clearly, use a 5% level of significance to test the manager's claim.

(7)



8. The random variable A is defined as

$$A = 4X - 3Y$$

where $X \sim N(30, 3^2)$, $Y \sim N(20, 2^2)$ and X and Y are independent.

Find

(a) $E(A)$, (2)

(b) $Var(A)$. (3)

The random variables Y_1, Y_2, Y_3 and Y_4 are independent and each has the same distribution as Y . The random variable B is defined as

$$B = \sum_{i=1}^4 Y_i$$

(c) Find $P(B > A)$. (6)



