3. Left-handed people make up 10% of a population.

A random sample of 60 people is taken from this population.

The discrete random variable Y represents the number of left-handed people in the sample.

(a) (i) Write down an expression for the exact value of $P(Y \leqslant 1)$

(ii) Evaluate your expression, giving your answer to 3 significant figures.

(3)

(b) Using a Poisson approximation, estimate $P(Y \leqslant 1)$

(2)

(c) Using a normal approximation and standardisation, estimate $P(Y \leqslant 1)$

(5)

(d) Give a reason why the Poisson approximation is a more suitable estimate of $P(Y \leqslant 1)$

(1)

(Total for Question 3 is 11 marks)