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Level 3 Mathematics and Statistics (Statistics), 2019

9.30 a.m. Thursday 28 November 2019

FORMULAE AND TABLES BOOKLET for 91584, 91585 and 91586

Refer to this booklet to answer the questions in your Question and Answer booklets.

Check that this booklet has pages 2–4 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.

MATHEMATICS AND STATISTICS (STATISTICS) – USEFUL FORMULAE AND TABLES

Permutations and Combinations

$${}^n P_r = \frac{n!}{(n-r)!}$$

$$\binom{n}{r} = {}^n C_r = \frac{n!}{(n-r)!r!}$$

Expectation Algebra

$$E[aX + b] = aE[X] + b$$

$$\text{Var}[aX + b] = a^2 \text{Var}[X]$$

$$E[aX + bY] = aE[X] + bE[Y]$$

$$\text{Var}[aX + bY] = a^2 \text{Var}[X] + b^2 \text{Var}[Y]$$

if X, Y are independent

Probability

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

Mean and Variance of a Discrete Random Variable

$$\begin{aligned} \mu &= E(X) & \sigma^2 &= \text{Var}(X) \\ &= \sum x.P(X=x) & \sigma &= \text{SD}(X) \\ & & &= \sqrt{\sum (x-\mu)^2 .P(X=x)} \\ & & &= \sqrt{E(X^2) - [E(X)]^2} \end{aligned}$$

Continuous Uniform Distribution

The probability density function, $f(x)$, for a continuous uniform distribution is defined as:

$$f(x) = \begin{cases} \frac{1}{b-a} & \text{for } a \leq x \leq b \\ 0 & \text{elsewhere} \end{cases}$$

