



QUESTION WORKBOOK

Combinations of normal random variables

Further Statistics 2 · Year FM

6 questions · 20 marks

PRINT EDITION

SECTION A · Warm-up

- A1** State the distribution of $aX + bY$ when X and Y are independent normal variables, and the one condition it needs. [2]

- A2** X is $N(12, 9)$ and Y is $N(7, 16)$, independently. Write down the distributions of $X + Y$ and $X - Y$. [3]

SECTION B · Standard

- B1** For the same X and Y , find $P(X < Y)$. [4]

- B2** X is $N(12, 9)$. Find the distribution of $X_1 + X_2 + X_3 + X_4 + X_5$ for five independent readings, and of $5X$ for a single one. Explain the difference. [4]

- B3** For the same X and Y , state the distribution of $2X - 3Y$. [3]

SECTION C · Stretch

- C1** People's weights are $N(70, 100)$ kg independently. Eight get into a lift rated for 600 kg. Find the probability that the rating is exceeded. [4]