7. The random variable X is defined as

$$X = 4A - 3B$$

where A and B are independent and

$$A \sim \mathrm{N}(15, 5^2) \qquad B \sim \mathrm{N}(10, 4^2)$$

(a) Find $\mathrm{P}(X < 40)$

(4)

The random variable C is such that $C \sim \mathrm{N}(20, \sigma^2)$

The random variables C_1, C_2 and C_3 are independent and each has the same distribution as C

The random variable D is defined as

$$D = \sum_{i=1}^{3} C_i$$

Given that $\mathrm{P}(A + B + D < 76) = 0.2420$ and that A, B and D are independent,

(b) showing your working clearly, find the standard deviation of C

(6)

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Question 7 continued

Question 7 continued

(Total for Question 7 is 10 marks)

TOTAL FOR PAPER IS 75 MARKS

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