7. Small containers and large containers are independently filled with fruit juice.

The amounts of fruit juice in small containers are normally distributed with mean 180 ml and standard deviation 4.5 ml

The amounts of fruit juice in large containers are normally distributed with mean 330 ml and standard deviation 6.7 ml

The random variable W represents the total amount of fruit juice in a random sample of 2 small containers minus the amount of fruit juice in 1 randomly selected large container.

$W \sim \mathrm{N}(a, b)$ where a and b are positive constants.

(a) Find the value of a and the value of b

(3)

(b) Find the probability that a randomly chosen large container of fruit juice contains more than 1.8 times the amount of fruit juice in a randomly chosen small container.

(5)

A random sample of 3 small containers of fruit juice is taken.

(c) Find the probability that the first container of fruit juice in this sample contains at least 5 ml more than the mean amount of fruit juice in all 3 small containers.

(6)

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Question 7 continued

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(Total for Question 7 is 14 marks)

TOTAL FOR PAPER IS 75 MARKS

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