8. A market stall sells cauliflowers classified by three different weights, small (S), medium (M) and large (L)

The weights, in grams, of these cauliflowers are modelled by independent normal distributions as shown below.

$$S \sim \mathrm{N}(265, 78^2) \qquad M \sim \mathrm{N}(625, 42^2) \qquad L \sim \mathrm{N}(886, 45^2)$$

The random variable T represents the total weight of 2 randomly selected medium cauliflowers minus the weight of 1 randomly selected large cauliflower.

$$T \sim \mathrm{N}(a, b)$$

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

(3)

(b) Using standardisation, find the probability that a randomly selected large cauliflower weighs more than 3 times the weight of a randomly selected small cauliflower.

(5)

A random sample of 2 small cauliflowers is taken.

(c) Using standardisation, find the probability that the first cauliflower in this sample weighs at least 100 grams more than the mean weight of both cauliflowers.

(5)

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TOTAL FOR PAPER IS 75 MARKS

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