7. The wingspans, W mm, of Speckled Wood butterflies are normally distributed, with $W \sim N(51, 1.7^2)$

A Speckled Wood butterfly is selected at random.

(a) Use standardisation to find the probability that this butterfly has a wingspan between 48.45 mm and 54.40 mm.

(3)

Given that this butterfly has a wingspan between 48.45 mm and 54.40 mm,

(b) find the probability that the wingspan of this butterfly is greater than 53.55 mm. You must show your working.

(3)

The wingspans, X mm, of Large White butterflies are also normally distributed, with $X \sim N(\mu, \sigma^2)$

Given that $P(X < 64.58) = 0.30$ and $P(X > 69.46) = 0.10$

(c) calculate the value of μ and the value of σ
You must show your working.

(4)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 7 continued

Question 7 continued

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Question 7 continued

(Total for Question 7 is 10 marks)