3. Every morning Navtej travels from home to work. Navtej leaves home at a random time between 08:00 and 08:15

- It always takes Navtej 3 minutes to walk to the bus stop
- Buses run every 15 minutes and Navtej catches the first bus that arrives
- Once Navtej has caught the bus it always takes a further 29 minutes for Navtej to reach work

The total time, T minutes, for Navtej's journey from home to work is modelled by a continuous uniform distribution over the interval $[\alpha, \beta]$

(a) (i) Show that $\alpha = 32$

(ii) Show that $\beta = 47$

(2)

(b) State fully the probability density function for this distribution.

(2)

(c) Find the value of

(i) E(T)

(ii) Var(T)

(3)

(d) Find the probability that the time for Navtej's journey is within 5 minutes of 35 minutes.

(2)

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Question 3 continued

(Total for Question 3 is 9 marks)