13.1

arrival rate $\lambda = 5$ persons/min

average waiting time $T_W = 5$ min

average service time for those who choose to eat in = 20 min

service time for "take away" = 0

$\mathbb{P}(\text{eat in}) = \mathbb{P}(\text{take away}) = \frac{1}{2}$

average time spent in the restaurant $T = T_W + T_S$

(T_S: average service time)

$$T_S = \underbrace{\mathbb{P}(\text{take away})}_{1/2} \times 0 + \underbrace{\mathbb{P}(\text{eat in})}_{1/2} \times 20 = 10 \text{ min}$$

$\therefore T = 5 + 10 = 15$

Little's theorem: $N = \lambda T = 5 \times 15 = 75$ persons

(N: average number of customers in the system (the restaurant))