Solution Wolff exercise 2.19

(a)

$$F_{local}(t) = \begin{cases} \frac{t}{5} & 0 \leq t \leq 5 \\ 0 & \text{otherwise} \end{cases}$$

$$F_{express}(t) = \begin{cases} \frac{t}{15} & 0 \leq t \leq 15 \\ 0 & \text{otherwise} \end{cases}$$

(b)

$$P(\text{alone}) = \frac{2}{3} \qquad P(\text{two alone}) = \frac{1}{3}$$

(c) The expected waiting time for an express train is $\frac{1}{2} \cdot 5 + \frac{1}{2} \cdot 10 = 7.5$. It is optimal to board since $11 + 7.5 > 17$.

(d)

$$\frac{1}{3}(2.5 + 11) + \frac{2}{3}(2.5 + 17) = 17.5$$

(e) Choose the express since $2.5 + 17 > 7.5 + 11$.