

## Exercise 2B

Note that because you are required to use tables in this exercise, when calculating the difference between two values (for example in question 2b), you would obtain a slightly different answer on your calculator; this is because the table contains values already rounded to 4 d.p. and so you may introduce inaccuracy at the fourth decimal place when combining values.

- 1 a Use tables with  $\lambda = 5.5$

$$P(X \leq 3) = 0.2017$$

- b Use tables with  $\lambda = 5.5$

$$P(X \geq 6) = 1 - P(X \leq 5) = 1 - 0.5289 = 0.4711$$

- c Use tables with  $\lambda = 5.5$

$$\begin{aligned} P(3 \leq X \leq 7) &= P(X \leq 7) - P(X \leq 2) \\ &= 0.8095 - 0.0884 = 0.7211 \end{aligned}$$

- 2 a Use tables with  $\lambda = 10$

$$P(X \geq 8) = 1 - P(X \leq 7) = 1 - 0.2202 = 0.7798$$

- b Use tables with  $\lambda = 10$

$$\begin{aligned} P(7 \leq X \leq 12) &= P(X \leq 12) - P(X \leq 6) \\ &= 0.7916 - 0.1301 = 0.6615 \end{aligned}$$

- c Use tables with  $\lambda = 10$

$$\begin{aligned} P(4 < X < 9) &= P(X \leq 8) - P(X \leq 4) \\ &= 0.3328 - 0.0293 = 0.3035 \end{aligned}$$

- 3 a Use tables with  $\lambda = 3.5$

$$P(X \geq 2) = 1 - P(X \leq 1) = 1 - 0.1359 = 0.8641$$

- b Use tables with  $\lambda = 3.5$

$$\begin{aligned} P(3 \leq X \leq 6) &= P(X \leq 6) - P(X \leq 2) \\ &= 0.9347 - 0.3208 = 0.6139 \end{aligned}$$

- c Use tables with  $\lambda = 3.5$

$$\begin{aligned} P(2 < X \leq 5) &= P(X \leq 5) - P(X \leq 2) \\ &= 0.8576 - 0.3208 = 0.5368 \end{aligned}$$

- 4 a Use tables with  $\lambda = 4.5$

$$P(X \geq 5) = 1 - P(X \leq 4) = 1 - 0.5321 = 0.4679$$

- b Use tables with  $\lambda = 4.5$

$$\begin{aligned} P(3 < X \leq 5) &= P(X \leq 5) - P(X \leq 3) \\ &= 0.7029 - 0.3423 = 0.3606 \end{aligned}$$

**4 c** Use tables with  $\lambda = 4.5$   

$$P(1 \leq X < 7) = P(X \leq 6) - P(X \leq 0)$$

$$= 0.8311 - 0.0111 = 0.8200$$

**5 a** Use tables with  $\lambda = 8$   

$$P(X \leq a) = 0.3134$$
 so  $a = 6$

**b** Use tables with  $\lambda = 8$   

$$P(X \leq b) = 0.7166$$
 so  $b = 9$

**c** Use tables with  $\lambda = 8$   

$$P(X < c) = P(X \leq c - 1) = 0.0996$$
 so  $c - 1 = 4$   

$$c = 5$$

**d** Use tables with  $\lambda = 8$   

$$P(X > d) = 1 - P(X \leq d) = 0.8088$$
 so  $P(X \leq d) = 1 - 0.8088 = 0.1912$   
 so  $d = 5$

**6 a** Use tables with  $\lambda = 3.5$   

$$P(X \leq a) = 0.8576$$
 so  $a = 5$

**b** Use tables with  $\lambda = 3.5$   

$$P(X > b) = 1 - P(X \leq b) = 0.6792$$
 so  $P(X \leq b) = 1 - 0.6792 = 0.3208$   
 so  $b = 2$

**c** Use tables with  $\lambda = 3.5$   

$$P(X \leq c) \geq 0.95$$
 This is true for all values of  $c > 6$

**d** Use tables with  $\lambda = 3.5$   

$$P(X > d) \leq 0.005$$
 So  $1 - P(X \leq d) \leq 0.005$   

$$P(X \leq d) \geq 1 - 0.005$$
  

$$P(X \leq d) \geq 0.995$$
 This is true for all values of  $d > 8$