(e)

$$\Pr(X \geq 3 | X \geq 2) = \frac{\Pr(X \geq 3 \cap X \geq 2)}{\Pr(X \geq 2)} \qquad \text{M1}$$

$$= \frac{\Pr(X \geq 3)}{\Pr(X \geq 2)} \qquad \text{A1}$$

$$\Pr(X \geq 3) = 1 + \left[ e^{-\frac{t}{2}} \right]_0^3 \qquad \text{(similar to part \textbf{c.})}$$

$$= 1 + e^{-\frac{3}{2}} - e^0$$

$$= e^{-\frac{3}{2}} \qquad \text{A1}$$

$$\therefore \Pr(X \geq 3 | X \geq 2) = \frac{e^{-\frac{3}{2}}}{e^{-1}}$$

$$= e^{-\frac{1}{2}}$$

$$= \frac{1}{\sqrt{e}} \qquad \text{A1}$$