

Question #265

Answer: D

$${}_tP_x = \exp\left[-\int_0^t 5rdr\right] = e^{-2.5t^2}$$

$${}_tP_y = \exp\left[-\int_0^t rdr\right] = e^{-0.5t^2}$$

$$\begin{aligned}q_{x:y}^1 &= \int_0^1 {}_tP_y {}_tP_x \mu_{x+t} dt = \int_0^1 e^{-0.5t^2} e^{-2.5t^2} 5t dt = 5 \int_0^1 e^{-3t^2} t dt \\ &= \frac{5}{6} e^{-3t^2} \Big|_0^1 = \frac{5}{6} (1 - e^{-3}) = 0.7918\end{aligned}$$