

## Question #211

Key: A

For current model  $f(x) = \frac{1}{4}e^{-\frac{x}{4}}$

Let  $g(x)$  be the new density function, which has

(i)  $g(x) = c, \quad 0 \leq x \leq 3$

(ii)  $g(x) = ke^{-x/4}, \quad x > 3^*$

(iii)  $c = ke^{-3/4}$ , since continuous at  $x = 3$

Since  $g$  is density function, it must integrate to 1.

$$1 = 3c + \int_3^{\infty} ke^{-x/4} dx = 3ke^{-3/4} + 4ke^{-3/4} = 3c + 4c \Rightarrow c = \frac{1}{7}$$

$$F(3) = \int_0^3 c dx = \int_0^3 \frac{1}{7} dx = \frac{3}{7} = 0.43$$

\*This could equally well have been written  $g(x) = d \times \left( \frac{1}{4} e^{-x/4} \right)$ , then let  $k = d/4$ , or even carry the  $d/4$  throughout.