Marked example 2

Paper 2 style · Graphic display calculator

2 5 marks SL 5.4 ●○○ Routine

Let $f(x) = x^2 \, \mathrm{e}^{-x/2}$.

(a) Find $f(1.3)$. **[1]**

(b) Find the gradient of the graph of f at the point where $x = 1.3$. **[2]**

(c) Hence find the equation of the tangent to the graph of f at this point. Give your answer in the form $y = mx + c$. **[2]**

MARKSCHEME (a)

$f(1.3) = 0.882 \;\; (0.882257\ldots)$ **A1**

Total 1 mark

MARKSCHEME (b)

use of GDC, or $f'(x) = \left(2x - \dfrac{x^2}{2}\right) \mathrm{e}^{-x/2}$ **(M1)**

$f'(1.3) = 0.916 \;\; (0.916190\ldots)$ **A1**

Total 2 marks

MARKSCHEME (c)

$y - 0.882257 = 0.916190(x - 1.3)$ **(M1)**

$y = 0.916x - 0.309$ **A1**

Total 2 marks

Note Accept $c = -0.308$ or -0.309 (premature rounding). FT from their answers to (a) and (b).

ON THE CALCULATOR

NumWorks (a) Calculation: type $1.3^2 e^{-1.3/2} \to 0.882257$. (b) Toolbox → Calculus → Derivative, type $x^2 e^{-x/2}$, then the value $1.3 \to 0.9161897$.

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