First Name: _____ Last Name: _____

Student-No: _____ Section: _____

Grade:

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Short answer question

1. [2 marks] Each part is worth 1 marks. Please write your answers in the boxes. Only your answers in the boxes will be marked (no partial credit).

   (a) Evaluate $\displaystyle\int \frac{2x^3}{\sqrt{2+3x^4}}\,dx$.

   Answer:

   (b) Evaluate $\displaystyle\int x^5 \log x\,dx$.

   Answer:

Long answer question—you must show your work

2. [4 marks] Each part is worth 2 marks.

   (a) Use the substitution $u = \sin^3 x$ to transform the integral $\displaystyle\int_{1/2}^{1} 3\sin^8 x \cos x \sqrt{1-\sin^3 x}\, dx$ into a new definite integral in the variable u. *Do not evaluate the resulting integral.*

   (b) Write an integral, without using absolute values, that represents the area of the finite region bounded by the curves $y = 3\,(e^x - 1)$ and $y = (e-1)(4x - x^2)$. *Do not evaluate the resulting integral, but justify why it is correct.*

Long answer question—you must show your work

3. [4 marks] Use an integral (arising from "horizontal slices") to find the volume of the solid of revolution obtained by rotating the entire disc $(x-6)^2 + y^2 \leq 25$ about the y-axis.

Answer:

Name: _____ Student-No: _____