Please, do NOT open this paper

until ANNOUNCED by your lecturer

EVERYBODY IS SUPPOSED TO START AT THE SAME TIME

1 (a) Evaluate the indefinite integral $\displaystyle\int \frac{1}{x\sqrt{\ln x}}\, dx$ (for $x > 0$).
       Hint: use an appropriate substitution.   2%

   (b) Calculate the area between $y = 5^x - \dfrac{8}{(x+2)^3}$ and the x-axis for $0 \le x \le 2$.

                                                                             2%

   (c) Express as a definite integral and then *evaluate* the limit of the Rie-
       mann sum $\displaystyle\lim_{n\to\infty} \sum_{i=1}^{n} \exp(-2x_i)\,\frac{1}{n},$ where we use the partition P
       with $x_i = \dfrac{2i}{n}$ for $i = 0, 1, \ldots, n$.   2%

   (d) Evaluate $\dfrac{d}{dx}\left(\displaystyle\int_{x^3+x}^{x+1} \exp(t\,\sin t)\, dt\right)$.   1%

   (e) Consider the three functions: $x^4,\ \sin(x^5 + x)$ and $x^4 + \sin(x^5 + x)$.
       Specify which of them is odd, even or neither.
       Hence, evaluate the integral $\displaystyle\int_{-1}^{1} (x^4 + \sin(x^5 + x))\, dx$.   2%

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2 Evaluate the indefinite integral $\displaystyle\int \sin^2 x\ \cos^5 x\ dx$.   3%

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3 Find the average value of the function $\dfrac{x-2}{x^2 - 6x + 10}$ on the interval $[3, 4]$.

                                                                             4%

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4 Evaluate the indefinite integral $\displaystyle\int x^3\,(\ln x)^2\ dx$.
   (Hint: use integration by parts.)   4%

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5 Perform a partial fraction expansion of $\dfrac{10}{(x^2 - 9)(x^2 + 1)}$;

   then *evaluate the indefinite integral* $\displaystyle\int \frac{10}{(x^2 - 9)(x^2 + 1)}\, dx$.   5%

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