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 $\displaystyle\int \frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx$. Hint: use an appropriate substitution.   2%

   (b) Calculate the area between $\displaystyle\int \frac{e^{-\sqrt{x}}}{\sqrt{x}}\,dx$ and the x-axis for $x > 0$.

   Hint: you may use the result of the previous question.   2%

   (c) Express as a definite integral and then *evaluate* the limit of the Riemann sum $\displaystyle\lim_{n\to\infty}\left(\frac{1}{n}\sum_{i=1}^{n}\cos\left(\frac{3(i-1)}{n}\right)\right)$.   2%

   (d) Evaluate $\displaystyle\frac{d}{dx}\left(\int_{\sin x}^{\sin(3x)}\sqrt{1+\sqrt{t}}\;dt\right)$.   2%

   (e) Evaluate the integral $\displaystyle\int_{-\pi/2}^{\pi/2}\left(\sin^2 x + \sin(x^3)\right)dx$.   2%

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

. . . .

3 Find the average value of the function $\displaystyle\frac{2}{x^2+4x+3}$ on the interval $[0,4]$.   4%

. . . .

4 Evaluate the indefinite integral $\displaystyle\int x^2\cos(2x)\;dx$.
  (Hint: use integration by parts.)   5%

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5 Perform a partial fraction expansion of $\displaystyle\frac{2-4x}{(x^2-2x+1)(x^2+1)}$;

  then *evaluate the indefinite integral* $\displaystyle\int \frac{2-4x}{(x^2-2x+1)(x^2+1)}\,dx$.   6%

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