

Sultan Qaboos University - College of Science
Department of Mathematics and Statistics
MATH 2108, Calculus II
Test1-SPRING 2008

Date: 10 March 2008

Total marks: 40

Time: 1 hour

SHOW ALL YOUR WORK.

1. [6 Marks] Find the exact arc length of the curve $x = t$, $y = \frac{t^2}{4} - \frac{1}{2} \ln t$, $1 \leq t \leq 2$.
 2. [1+2+2+4=9 Marks]
 - (a) Find the domain and range of the function $y = \cosh^{-1} x$?
 - (b) Sketch the graph of the function $y = \cosh^{-1} x$.
 - (c) Calculate the exact value of $\cosh^{-1}(\cosh(-\pi))$.
 - (d) Prove that $\cosh^{-1} x = \ln(x + \sqrt{x^2 - 1})$.
 3. [1+4+3=8 Marks]
 - (a) Sketch the region enclosed by the curves $x + y = 1$, $x = 0$, $y = 0$.
 - (b) Use any method to find the volume of the solid generated when the region in part (a) is revolved about the y -axis.
 - (c) Use any method to find the volume of the solid generated when the region in part (a) is revolved about the line $x = -1$.
 4. [5 + 5=10 Marks] Evaluate the following integrals:
 - (a) $\int \sin^4 \pi x \cos^3 \pi x dx$
 - (b) $\int_0^1 \ln(x + 1) dx$
 5. [7 Marks] Find the surface area of the solid generated by revolving the curve $y = 1 + x^{1/3}$, $0 \leq x \leq 1$ about the y -axis.
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END OF PAPER