

미적분학 및 연습 I (MATH161) 제 2 차시험 (2011 년 1 학기)

학과:

학번:

이름:

1. (12 점) Let S be the solid generated by revolving the region bounded by $y = 1 - 3x^2$ and $y = -2$ about the y -axis. Let V be the volume of the solid generated by revolving S about the x -axis. Find V .

2. (13 점) Find the area of the surface generated by revolving the curve $y = \cosh^{-1}(x)$, $0 \leq y \leq \ln(2)$ about y -axis.

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3. (12점) Use a theorem of Pappus to find the volume generated by revolving about the line $x+y=6$ the triangular region bounded by the coordinate axes and the line $2x+y=6$.

4. (13점) Find the centroid of the region bounded by the graphs of $y = x + \cos(x)$ and $y = 0$ for $0 \leq x \leq 2\pi$.

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5. (12점) Find the value of the constant C for which the integral

$$\int_0^{\infty} \left(\frac{1}{\sqrt{x^2 + 4}} - \frac{C}{x + 2} \right) dx$$

converges. Evaluate the integral for this value of C .

6. (13점) Consider the infinite series

$$\sum_{n=1}^{\infty} \frac{n}{(n+1)!}$$

Show that the given series is convergent, and find its sum.

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학번:

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7. (13 점) Find the values of p for which the series

$$\sum_{n=1}^{\infty} \frac{\ln(n)}{n^p}$$

is convergent.

8. (12 점) Find the sum of the series,

$$\sum_{n=1}^{\infty} \frac{40n}{(2n-1)^2(2n+1)^2}$$