C2-UA.412: calc 2

Practice Exam

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Total: 100 points

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1. Find the volume of the solid generated by revolving the region bounded by the curves $y = x^2$ and $y = 4x - x^2$ about the x-axis. Set up the integral and solve.

2. Evaluate the integral "+(from 0 to < ó"’ 6–ë2‡,–6÷;"‡,’ G, W6–ær appropriate trigonometric substitution. Show all steps of your work.

3. Determine whether the series :2 †g&öÒ ãÓ Fò !â’ †ë" ² ’ ò †ë2 ² &â’ converges or diverges. Justify your answer using an appropriate convergence test.

4. Find the arc length of the curve $y = (x^3/6) + (1/(2x))$ from $x = 1$ to $x = 2$. Set up the integral and solve.

5. A tank is in the shape of an inverted cone with a height of 10 meters and a radius of 5 meters. The tank is filled with water to a depth of 6 meters. Find the work required to pump all the water out of the top of the tank. Assume the density of water is 1000 kg/m³ and acceleration due to gravity is 9.8 m/s².

6. Find the Taylor series for f(x) = e^(2x) centered at x = 1. Write out the first four non-zero terms.

7. Use the method of partial fractions to evaluate the integral "+(from 1 to 2) $(3x + 1) / (x^2 - x - 2)\, dx$.

8. Determine the interval of convergence for the power series :2 †g&öÒ ãÓ to ") $[(x-3)^n] / (n + 1)^2$.

9. Find the area of the region enclosed by the polar curve r = 2 + 2cos(;,’à

10. Evaluate the improper integral "+(from 1 to ") $(1/x^2)\, dx$. Does this integral converge or diverge? If it converges, what is its value?