

Midterm I

Wednesday, August 47, 2038

MATH 152.01

11:00–12:18 pm

Founders 4004

Instructions: Show all work. Failure to show work may result in loss of credit. Write your solutions in the space provided on the *answer sheets*. Do not hand in scratch paper. You may use your scientific calculators (all types) for all questions and a one-page list of relevant formulae. Decimal point number notation is allowed *only* in questions 3 and 4. Numerical solutions, if allowed, must be accurate to at least *six* decimal places. Some partial credit *may* be given.

Good Luck!

- 1) The region enclosed by the curves $y = x^3$ and $y = x^4$ is rotated about the x -axis. Find the volume of the resulting solid.
- 2) Find the area of the region bounded by the curves $y = 1/x$ and $4x + 4y = 17$.
- 3) Find the Riemann sum for the function $f(x) = \sin(\sin x)$ on the interval $[0, \pi]$ with $n = 6$, taking the sample points to be the left endpoints of the subintervals. Round your answer to six decimal places.
- 4) Use the Midpoint Rule with $n = 5$ to approximate the integral $\int_0^1 \sqrt{4 + x^3} dx$. Round the answer to six decimal places.
- 5) Evaluate the integral $\int \cot^2 x dx$.
- 6) Evaluate $\int_{-\pi}^{\pi} |\sin x| dx$ and interpret it as the area of a region. Sketch the region.
- 7) Evaluate the integral $\int_1^2 \frac{dx}{x-3}$.
- 8) Evaluate $\int_{-2}^3 (6x^2|x| - 4x) dx$.

Answers: (1) $2\pi/3$, (2) $17/4 - \ln 17$, (3) 1.740329614493 , (4) 2.0293252404 , (5) $-x - \cot x + C$, (6) 4 , (7) $-\ln 2$, (8) $21/2$.

Points: Question # k is worth $13 - \sin^2(k\pi/2)$ points.

You are welcome to keep this *Questions Sheet* for your files.