University of California, Riverside
Department of Mathematics

Midterm

Mathematics 9B - First Year of Calculus
Sample 3

Instructions: This exam has a total of 100 points. You have 50 minutes. You must show all your work to receive full credit You may use any result done in class. The points attached to each problem are indicated beside the problem. You are not allowed books, notes, or calculators. Answers should be written as $\sqrt{2}$ as opposed to 1.4142135....

1. (20 points) Divide the interval $[-1, 1]$ into four subinterval of equal length $\frac{1}{2}$ and compute the left-endpoints Riemann sum of $y = 1 - x^2$.
2. Use the fundamental theorem of calculus to compute the following definite integrals:
   (a) (10 points) $\int_0^{\frac{\pi}{2}} \frac{\sin x}{(3+2\cos x)^5} dx =$
   (b) (10 points) $\int_0^{\frac{\pi}{2}} \sin^2 x \cos x dx =$
3. Find the volume of the solid obtained by rotating the region in the first quadrant between the curves $y = x^3 - 3x$ and $y = x$ around the y-axis.
4. (20 points) Find the area of the region between the graphs of $f(x) = \sqrt{x}$ and $g(x) = x^3$ from $x = 0$ to $x = 1$.
5. (20 points) Evaluate $\int_0^5 |x - 1| \, dx$. (Suggestion: sketch the graph.)