AMS 151Final Exam Fall 2024(1-7 are 14 points each. 8 is worth 2 points.)

Name:

1. Find $\frac{dy}{dx}$ if $y = (\tan(6x))\sqrt{sinx}$

2. Compute $\int x\sqrt{7x-1}dx$.

3. Graph $f(x) = -2x^3 + 6x^2 - 3$ with critical points using the first derivative test. (X intercepts not required.)

4. Calculate the following limit:

$$\lim_{x \to 0^+} x(lnx)^2$$

5. Use left, right, and midpoint Riemann sums (n=4) to estimate $\int_0^8 2x dx$.

6. Find the exact area between $y = x^2 + 2$ and the x axis from x=1 to x=3.

7. You have been asked to design a one liter can shaped like a right cylinder. What should the radius be to minimize surface area? The volume is $\pi r^2 h$ and the surface area is $2\pi r^2 + 2\pi rh$.

8. True or false: The horizontal asymptote of $y = e^{-2x}$ is y=0.