

Show all work. Arithmetic expressions do not need to be simplified in your final answer.

1. **(6 points)** Find the *general* antiderivative of the function  $f(t) = e^t - \frac{3}{t^2} + \sqrt[3]{t} - \frac{6}{\sqrt{1-t^2}}$ .

2. **(5 points)** Find a function  $f(x)$  such that  $f'(x) = 5x^3 + x - 4$  and  $f(2) = 9$ .

3. **(4 points)** From the back seat of a car on a two-hour trip which started at noon, you have managed to see the speedometer once every quarter hour. Based on the information which you have compiled into the table below, estimate the distance you have traveled.

Time	12:00	12:15	12:30	12:45	13:00	13:15	13:30	13:45	14:00
Speed (in miles per hour)	10	45	60	50	80	70	75	50	10

4. **(5 points)** Write the Riemann sum  $\lim_{n \rightarrow \infty} \frac{7}{n} \sum_{i=1}^n \sqrt{2 + \frac{7}{n}}$  as a definite integral.

5. **(2 point bonus)** Without using antiderivatives, explain why for an odd function  $f(x)$  (that is, a function for which  $f(-x) = -f(x)$ ), it must be the case that  $\int_{-a}^a f(x) = 0$ .