

Q1 (2 pts): Using three rectangles and left endpoints, estimate the area under the graph of

$$f(x) = \frac{1}{x+1} \text{ from } x = 0 \text{ to } x = 3$$

Q2 (2 pts): Given that f is an even function, $\int_{-1}^1 f(x)dx = 5$, and $\int_{-2}^2 f(x)dx = 2$. Find

the value of $\int_1^2 f(x)dx$

Q3 (2 pts): Express the limit:
$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \left[\frac{1}{n} + \frac{i}{n^2} + \frac{1}{n} e^{1+\frac{i}{n}} \right]$$

as a definite integral and then evaluate.

Q4 (2 pt): Find the indefinite integral

$$\int \left[\frac{(2 + \sqrt{x})^2}{x} + \sec x (\sin 2x + \tan x) \right] dx$$

Q5 (2 pts): Find the value of $\int_{-\pi}^{\pi} (4 + 3\sin x) \sqrt{\pi^2 - x^2} dx$

Q6 (2 pts): The acceleration (in m/s^2) and the initial velocity for a particle moving along a line are given by

$$a(t) = 2t - 1, \quad v(0) = -2, \quad 0 \leq t \leq 3.$$

Find the distance traveled by the particle during the given time interval.

Q7 (2 pts): Find the equation of the tangent line to the graph of $f(x) = \int_{\sqrt{x}}^{x^3} e^{u^2} du$

at $x = 1$