1. Using three approximating rectangles and midpoints, to approximate the area under the graph of \( f(x) = \frac{x}{x - 1} \) from \( x = 2 \) to \( x = 8 \)

2. Using the definition of the definite integral, to find the value of the limit

\[
\lim_{n \to \infty} \sum_{i=1}^{n} \frac{2}{n} \sqrt{\frac{4 + \frac{3i}{n}}{n}}
\]
3. By interpreting it as an area, find the value of the integral

\[ \int_{0}^{1} (|x - 1| + 2\sqrt{1 - x^2})dx \]

4. Find the slope of the tangent line to the graph of the function \( f(x) = \int_{\tan x}^{1} \frac{1}{\sqrt{1 + t^2}}dt \) at \( x = \frac{\pi}{3} \).
5. Find the value of the integral \( \int_0^1 \frac{x^3 + x^2 + x + 1}{x + 1} \, dx \)

6. If \( f \) is an even function and \( \int_{-2}^{2} f(x) \, dx = 4 \) and \( \int_{-2}^{7} f(x) \, dx = 5 \). Then find the value of \( \int_0^7 f(x) \, dx \)
7. Use the properties integral of integrals to verify the following inequality

\[ \frac{\sqrt{2}\pi}{24} \leq \int_{\pi/6}^{\pi/4} \cos x \, dx \leq \frac{\sqrt{3}\pi}{24} \]