

Question 1:

(a)[4] Suppose $\int_a^b f(x) dx = a$ and $\int_a^b g(x) dx = b$. What is the average value of $f(x) - g(x)$ over the interval $[a, b]$? Simplify your final answer.

(b)[3] Determine $\int e^{2x} \sin(e^{2x}) dx$.

(c)[3] Evaluate $\int_{-\sqrt{3}}^{\sqrt{3}} \frac{4x}{\sqrt{x^2 + 1}} dx$.

Question 2:

(a)[4] Determine $\int \arctan(t) dt$.

(b)[6] Determine $\int x(\ln(x))^2 dx$.

Question 3:

(a)[7] Determine $\int \tan^3(x) \sec^5(x) dx$.

(b)[3] Evaluate $\int_0^1 \cos^2(\pi x) dx$.

Question 4 [10 points]: Determine $\int \frac{\sqrt{9-x^2}}{x^2} dx$.

Question 5 [10 points]: Determine $\int \frac{1}{(x-2)(x+1)^2} dx$.