

Question 1:

(a)[3] Determine $\int e^{3x} \cos(e^{3x}) dx$.

(b)[3] Evaluate $\int_{-\sqrt{8}}^{\sqrt{8}} \frac{9x}{\sqrt{x^2 + 1}} dx$.

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

Question 2:

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

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

Question 3:

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

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

Question 4 [10 points]: Determine $\int \frac{\sqrt{16-x^2}}{x^2} dx$.

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