

Question 1:

(a)[2] Determine $\frac{d}{dx} \left[\int_0^1 e^{\arctan(x)} dx \right]$.

(b)[2] Determine $\int_0^1 \frac{d}{dx} [e^{\arctan(x)}] dx$.

(c)[2] Determine $\frac{d}{dx} \left[\int_0^x e^{\arctan(t)} dt \right]$.

(d)[4] Determine $\int \frac{\sin(\sqrt{x})}{\sqrt{x}} dx$.

Question 2:

(a)[4] Determine $\int (t - 1) \ln(t) dt$.

(b)[6] Determine $\int e^{-x} \cos(x) dx$.

Question 3:

(a)[7] Evaluate $\int_0^{\pi/2} \sin^3(x) \cos^3(x) dx$.

(b)[3] Determine $\int \cot(\pi x) dx$.

Question 4 [10 points]: Determine $\int \frac{128}{x^3 \sqrt{x^2 - 16}} dx$.

Question 5 [10 points]: Determine $\int \frac{1}{x^3 + 9x^2} dx$.