

Question 1:

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

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

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

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

Question 2:

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

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

Question 3:

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

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

Question 4 [10 points]: Determine $\int \frac{54}{x^3\sqrt{x^2-9}} dx$.

Question 5 [10 points]: Determine $\int \frac{1}{x^3 + 4x^2} dx$.