Calculus & Analytical Geometry II

Lecture 8 Worksheet

Spring 2021 **Subhadip Chowdhury** **Math 112**

Question 1.

Find the following integrals.

(a) $\int \sqrt{9-x^2}\,dx$

[Hint: You might need the trigonometric identity $\sin(2\theta) = 2\sin\theta\cos\theta$.]

(b) $\int_0^1 \arctan x\,dx$

(c) $\int \ln x \frac{\sqrt{1-(\ln x)^2}}{x}\,dx$

(d) You will need know the integral $\int \sec x\,dx$ to do the next problem.

Here's a not very intuitive first step. Rewrite the integral as

$$\int \sec x\,dx = \int \frac{\sec x(\sec x + \tan x)}{\sec x + \tan x}\,dx$$

Then try a u-substitution!

(e) $\int \sin(9x)\sin(4x)\,dx$

(f) $\int \sqrt{1+x^2}\,dx$

(g) $\int e^{x+e^x}\,dx$

(h) $\int_1^e \frac{1+\ln x}{x\ln x}\,dx$

(i) $\int \frac{x^3+x^2+2x}{x^2+1}\,dx$

(j) $\int \tan^3 x\sec^3 x\,dx$

(k) $\int \frac{1}{1+16x^2}\,dx$

(l) $\int \cos^2 x\sin^2 x\,dx$

(m) $\int \frac{1}{x^2+4x+5}\,dx$

(n) $\int_0^{\pi/4} x\sin(2x)\,dx$

(o) $\int_1^{\sqrt{3}} \arctan(1/x)\,dx$

(p) $\int_0^3 \ln(x^2+1)\,dx$