

Math 1552: Integral Calculus
Integration and Series Review

1. Evaluate the following integrals.

(a) $\int x \tan^{-1}(x) dx$

(b) $\int \frac{\cos^3(x)}{\sin x} dx$

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

2. Does the alternating series $\sum_{k=1}^{\infty} \frac{(-1)^k}{k+\sqrt{k}}$ converge absolutely, converge conditionally, or diverge?

3. Use a MacLaurin series to estimate $\int_0^1 e^{-x^2} dx$ within an error of no more than 0.01.