

UWC integrator of the year competition

Practice Test

Evaluate the following integrals

1.  $\int \frac{dx}{(\tan x) \ln(\sin x)}$  (A simple u substitution)

2.  $\int \cos(\ln x) dx$  (First a substitution and then integration by parts)

3.  $\int \frac{\sqrt{x^3-1}}{x} dx$  (Put  $u = \sqrt{x^3-1}$  to obtain

a  $\int \frac{u^2}{1+u^2}$  type situation.

*Now use long division)*

4.  $\int \frac{x^2}{1+x^4} dx$

(Think of  $1+x^4 = (1+x^2)^2 - 2x^2$ )

1.  $\int_0^1 \ln(\sqrt{1-x} + \sqrt{1+x}) dx$  Hint: Use  $x = \sin 2\theta$