

Quiz 14 - Calculus 1A  
 December 6, 2004  
 Jonathan Dorfman

Use opposite side of page to answer as many questions as you can (20 + 8 points total) in 20 minutes. Show clearly what substitutions you are making (e.g.  $u = \dots$ ,  $du = \dots dx$ ), and verify your answers.

1. (10 *points*) Evaluate the following - including the constant of integration:

$$\int 2x\sqrt[3]{1+x^2} dx$$

2. (5 *points*) Evaluate the following - including the constant of integration:

$$\int \frac{x}{\sqrt{1-4x^2}} dx$$

3. (5 *points*) Evaluate **one** of the following integrals:

$$\int \sqrt{2x+1} dx \quad \int e^{5x} dx \quad \int \tan x dx \quad \int x^3 \cos(x^4+2) dx$$

Extra Credit. (1 *point each*) Evaluate any of the other integrals in Problem #3.

Extra Credit. (1 *point*) Evaluate the following integral:

$$\int x^5\sqrt{1+x^2} dx$$

Extra Credit. (1 *point each*) Evaluate any of the following Definite Integrals:

$$\int_0^4 \sqrt{2x+1} dx \quad \int_0^{\sqrt{3}/4} \frac{x}{\sqrt{1-4x^2}} dx \quad \int_1^e \frac{\ln x}{x} dx$$

Extra Credit. (1 *point*) Show that

$$\frac{1}{2} < \ln 2 < \frac{3}{4}$$

using the definition

$$\ln x \stackrel{\text{def}}{=} \int_1^x \frac{dt}{t}$$