SUBSTITUTION (7.1) NAME_____

Evaluate the following integrals exactly using the substitution method. Use proper notation.

1. $\int \cos^2\left(\frac{\theta}{5}\right)\sin\left(\frac{\theta}{5}\right)d\theta$

$u =$

$du =$

2. $\int (t+1)e^{5t+5}dt$

$u =$

$du =$

3. $\int \frac{e^{\sqrt{x}}}{\sqrt{x}}dx$

$u =$

$du =$

4. If $\int_0^3 \frac{1}{1+y^2}dy = k$, find $\int_0^1 \frac{1}{1+9x^2}dx$ in terms of k.

$u =$

$du =$

$\_\_\_\_ \le u \le \_\_\_\_$

For each integral decide which of the following is needed: 1) substitution, 2) algebra or a trig identity, 3) nothing needed, or 4) can't be done by the techniques in Calculus I. Then evaluate each integral (except for the 4th type of course).

A. $\int \left(x^3+1\right)dx$ $\int x^2\left(x^3+1\right)^4 dx$ $\int \sqrt{x^3+1}dx$ $\int \left(x^3+1\right)^2 dx$

B. $\int \sqrt{x}\left(1-x^2\right)dx$ $\int \sqrt{1-x^2}dx$ $\int \frac{1}{\sqrt{1-x^2}}dx$ $\int \frac{xdx}{\sqrt{1-x^2}}$

C. $\int \cos^2 x \sin^3 x dx$ $\int \sqrt{1-\cos^2 x}dx$ $\int \frac{dx}{\cos^2 x}$ $\int \frac{dx}{\cos x\sqrt{\sin x}}$

D. $\int \tan x \sec x dx$ $\int \tan x \cos x dx$ $\int \frac{\sec^2 x}{\sqrt{\tan x}}dx$ $\int \frac{dx}{\tan x+1}$

E. $\int e^{-x^2}dx$ $\int \frac{e^x}{3+e^x}dx$ $\int \left(e^x+3\right)dx$ $\int \frac{\ln\left(e^{2x}\right)}{x^2}dx$