Calculus

Name Key

Date_____ Period____

U- Substitution

Express each definite integral in terms of *u*.

1) $\int_{-1}^{0} -24x^2(4x^3+1)^3\,dx;\ u = 4x^3+1$

$\int_{-3}^{1} -2u^3\,du$ $= 40$

2) $\int_{-1}^{0} 6x(x^2-2)^2\,dx;\ u = x^2-2$

$\int_{-1}^{-2} 3u^2\,du$ $= -7$

3) $\int_{0}^{1} \frac{2x}{(x^2+1)^3}\,dx;\ u = x^2+1$

$\int_{1}^{2} \frac{1}{u^3}\,du$ $= 3/8$

4) $\int_{0}^{2} \frac{12x}{(2x^2+4)^2}\,dx;\ u = 2x^2+4$

$\int_{4}^{12} \frac{3}{u^2}\,du$ $= 1/2$

5) $\int_{1}^{2} -\frac{2x}{(x^2+1)^2}\,dx;\ u = x^2+1$

$\int_{2}^{5} -\frac{1}{u^2}\,du$ $-3/10$

6) $\int_{-1}^{1} 18x^2(3x^3+1)^2\,dx;\ u = 3x^3+1$

$\int_{-2}^{4} 2u^2\,du$ $= 48$

Evaluate each indefinite integral.

7) $\int -\frac{24x}{4x^2+5}\,dx$

$-3\ln(4x^2+5)+C$

8) $\int -\frac{32x}{4x^2-5}\,dx$

$-4\ln|4x^2-5|+C$

9) $\int \frac{6\sec^2 3x}{\tan 3x}\,dx$

$2\ln|\tan 3x|+C$

10) $\int \frac{15e^{3x}}{e^{3x}+4}\,dx$

$5\ln(e^{3x}+4)+C$