

**Substitution Rule for Indefinite Integrals, Part II**

Compute each of the following integrals. Clearly show the substitution used for each integral and how it was used. In other words, don't just write an answer down for any of these.

1.  $\int \csc(2-x)\cot(2-x) + xe^{x^2} dx$

2.  $\int \frac{7-9y}{25+y^2} dy$

3.  $\int \frac{\sin(\frac{1}{t})}{t^2} dt$

4.  $\int z^{17}(2-z^9)^6 dz$

**Area Problem**

5. Using  $n = 4$  estimate the area under  $g(x) = 4 + \ln(1-x)$  on  $[-2, -1]$  using the midpoint of each interval.

**The Definition of the Definite Integral**

6. Given  $\int_4^{-1} f(x) dx = -9$  and  $\int_4^{-1} g(x) dx = 2$  determine the value of  $\int_{-1}^4 6f(x) - 7g(x) dx$ .

7. Given  $\int_1^{-7} f(x) dx = -2$ ,  $\int_2^{-7} f(x) dx = 10$  and  $\int_6^2 f(x) dx = -7$  determine the value of  $\int_1^6 f(x) dx$

8. Differentiate :  $\int_{\cos(x)}^4 \sqrt{1+t^2} dt$

**Computing Definite Integrals**

Compute each of the following integrals.

9.  $\int_1^4 12x^3 - 10\sqrt{x^3} + \frac{16}{x^2} dx$

10.  $\int_0^{\frac{\pi}{4}} 2\sin(\theta) - \sec^2(\theta) d\theta$

11.  $\int_1^5 f(t) dt$  where  $f(t) = \begin{cases} 3t^2 + 1 & \text{if } t \geq 4 \\ 8 & \text{if } t < 4 \end{cases}$

Continued on Back  $\Rightarrow$

$$12. \int_3^6 |12 - 3z| dz$$

$$13. \int_1^2 6 - \frac{1}{3y^3} dy$$

$$14. \int_{-2}^2 6 - \frac{1}{3y^3} dy$$

$$15. \int_{13}^{13} \frac{\cos(x) - 4\sin(x)}{e^x} dx$$