KEY

Class Work

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Use the given substitution to replace the given integral with an integral involving the variable u. (Do not evaluate the integral.)

1. $\int_{0}^{2} \frac{x}{\sqrt{5-x^2}}dx, \quad u=5-x^2$

$+\frac{1}{2}\int_{1}^{5} \frac{1}{\sqrt{u}} du = -\frac{1}{2}\int_{5}^{1} u^{-1/2} du$

2. $\int_{0}^{1} \frac{e^{\sqrt{x}}}{\sqrt{x}}dx, \quad u=\sqrt{x}$

$\int_{0}^{1} 2e^{u} du$

3. $\int_{1}^{3}(2x-1)^3 dx, \quad u=2x-1$

$\frac{1}{2}\int_{1}^{5} u^3 du$

4. $\frac{3}{2}\int_{0}^{4} x\sqrt{25-x^2}dx, \quad u=25-x^2$

$-\frac{3}{2}\int_{25}^{9} \sqrt{u} du = \frac{3}{2}\int_{9}^{25} \sqrt{u} du$

5. $\int_{-½}^{½}\cos(\pi\theta)d\theta, \quad u=\pi\theta$

$\frac{1}{\pi}\int_{-\pi/2}^{\pi/2} \cos u\, du$

6. $\int_{0}^{1}(x+2)(x+1)^5 dx, \quad u=x+1$

$\int_{1}^{2} (u+1)u^5 du = \int_{1}^{2}(u^6+u^5)du$

Evaluate the integral by making an appropriate substitution.

7. $\int_{-\pi}^{0}\sin(3x-\pi)dx$

$\frac{2}{3}$

8. $\int_{2}^{3}\frac{x}{x^2-2}dx$

$\frac{1}{2}\ln\left(\frac{7}{2}\right)$

$\frac{1}{2}\left(\ln 7 - \ln 2\right)$

9. $\int_{0}^{½}\sqrt[3]{\sin x}\cos x\,dx$

$\frac{3}{4}$