§4.5 Substitution
(Reversing the Chain Rule)

The differentiation rule that helps us understand why the Substitution Rule works is:

a) The product rule.

b) The chain rule.

c) The quotient rule.

d) All of the above.

Find the indefinite integrals.

a) $\int x^2\sqrt{x^3+21}\,dx$

b) $\int \cos^4(\theta)\sin(\theta)\,d\theta$

c) $\int (9t+7)^{\frac{4}{5}}\,dt$

d) $\int (x+5)\sqrt{10x+x^2}\,dx$

e) $\int \frac{z^3}{\sqrt[3]{3+z^4}}\,dz$

f) $\int x(8x+7)^8\,dx$

Find the indefinite integrals and evaluate the definite integrals.

a) $\int x^3\sqrt{x^2+4}\,dx$

b) $\int x^5\sin(x^6)\,dx$

c) $\int \sec^2(\theta)\tan^7(\theta)\,d\theta$

d) $\int \sqrt{x^5}\sin(2+x^{7/2})\,dx$

e) $\int \frac{\cos(\pi/x^{29})}{x^{30}}\,dx$

f) $\int \sin(45t)\sec^2(\cos(45t))\,dt$

If f is continuous and $\displaystyle\int_0^4 f(x)\,dx = 2$, find $\displaystyle\int_0^2 f(2x)\,dx$.

Evaluate the definite integrals.

a) $\int_0^1 \sqrt[3]{1+7x}\,dx$

b) $\int_0^{\sqrt[14]{\pi}} x^{13}\cos(x^{14})\,dx$

c) $\int_0^{\pi/10} \cos(5x)\sin(\sin(5x))\,dx$

d) $\int_0^{31} \frac{dx}{\sqrt[3]{(1+4x)^2}}$

e) $\int_9^{10} x\sqrt{x-9}\,dx$