Calculus   Worksheet #3   Unit 9   Selected Solutions

Integrate each of the following.

6. $\int x^2(x^3-1)^6 \, dx = \frac{1}{21}(x^3-1)^7 + C$

$\frac{1}{3}\int (x^3-1)^6 \, (3x^2 dx) =$

12. $\int \frac{x^2 dx}{\sqrt{x^3+8}} = \frac{2}{3}\sqrt{x^3+8} + C$

$\frac{1}{3}\int (x^3+8)^{(-1/2)}(3x^2 dx) = \frac{2}{3}(x^3+8)^{(1/2)} + C =$

16. $\int \sec(3x)\,\tan(3x)\,dx =$

$\frac{1}{3}\int \sec(3x)\,\tan(3x)\,[3dx] = \frac{1}{3}\sec(3x) + C$

$\int \sec u\, \tan u\, du = \sec u + C$

$u = 3x \quad du = 3dx$

19. $\int x\,\sin(2x^2+3)\,dx =$

$\frac{1}{4}\int \sin(2x^2+3)\,[4x dx] = \frac{-1}{4}\cos(2x^2+3) + C$

$\int \sin u\, du = -\cos u + C$

$u = 2x^2+3 \qquad du = 4xdx$

21. $\int x^3 \csc^2(x^4-3)\,dx =$

$\frac{1}{4}\int \csc^2(x^4-3)\,[4x^3 dx] = \frac{-1}{4}\cot(x^4-3) + C$

$\int \csc^2 u\, du = -\cot u + C$

$u = x^4-3 \qquad du = 4x^3 dx$

25. $\int \frac{\cos\sqrt{x}\ dx}{\sqrt{x}} =$

$2\int \cos\sqrt{x}\ \left[\frac{dx}{2\sqrt{x}}\right] = 2\sin\sqrt{x} + C$

$\int \cos u\, du = \sin u + C$

$u = \sqrt{x} = x^{(1/2)}$

$du = \frac{1}{2}x^{(-1/2)} dx = \left[\frac{dx}{2\sqrt{x}}\right]$