Calculus   Worksheet #2   Unit 9   Selected Solutions

Integrate each of the following.

1. $\int \sin(5x)\,dx =$

$\frac{1}{5}\int \sin(5x)\,[5dx] = \frac{-1}{5}\cos(5x) + C$

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

$u = 5x \quad du = 5dx$

7. $\int x\,\sin(x^2)\,dx =$

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

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

$u = x^2 \quad du = 2xdx$

8. $\int x\,\sec^2(1 - x^2)\,dx = \frac{-1}{2}\int \sec^2(1 - x^2)\,[-2xdx] = \frac{-1}{2}\tan(1 - x^2) + C$

$\int \sec^2 u\,du = \tan u + C$

$u = 1 - x^2 \quad du = -2xdx$

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

$$= \frac{1}{4}\csc(1 - x^4) + C$$

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

$u = 1 - x^4 \quad du = -4x^3dx$

19. $\int \cot^3(5x)\csc^2(5x)\,dx = \frac{-1}{5}\int \cot^3(5x)\,[-5\csc^2(5x)\,dx] =$

$$= \frac{-1}{5}\cdot\frac{1}{4}\cot^4(5x) + C = \frac{-1}{20}\cot^4(5x) + C$$

$\int u^3\,du = \frac{1}{4}u^4 + C$

$u = \cot(5x) \quad du = -5\csc^2(5x)\,dx$