# Calculus Practice: Techniques for Finding Antiderivatives 12b

**Evaluate each indefinite integral. Use the provided substitution.**

1) $\int 2\sec x\tan x\sec^2(\sec x)\,dx;\ u = \sec x$

2) $\int 10\csc^2 -2x\sec^2(\cot -2x)\,dx;\ u = \cot -2x$

3) $\int 6\csc 3x\cot 3x\csc^2(\csc 3x)\,dx;\ u = \csc 3x$

4) $\int -2\csc^2 x\csc^2(\cot x)\,dx;\ u = \cot x$

5) $\int -10\sin -2x\sec^2(\cos -2x)\,dx;\ u = \cos -2x$

6) $\int -12\sec 3x\tan 3x\sec(\sec 3x)\,dx;\ u = \sec 3x$

7) $\int -12\cos -4x\tan(\sin -4x)\,dx;\ u = \sin -4x$

8) $\int 5\sec^2 -x\cot(\tan -x)\,dx;\ u = \tan -x$

9) $\int 3\sin 3x\csc(\cos 3x)\,dx;\ u = \cos 3x$

10) $\int 4\cos -4x\tan(\sin -4x)\,dx;\ u = \sin -4x$

11) $\int -\frac{8\cos 2x}{\sec(\sin 2x)}\,dx;\ u = \sin 2x$

12) $\int -\frac{4\sec^2 4x\cos(\tan 4x)}{\sin^2(\tan 4x)}\,dx;\ u = \tan 4x$

13) $\int \frac{3\csc x\cot x}{\sin^2(\csc x)}\,dx;\ u = \csc x$

14) $\int \frac{15\csc^2 5x}{\csc(\cot 5x)}\,dx;\ u = \cot 5x$

15) $\int -\frac{20\csc^2 4x\sin(\cot 4x)}{\cos^2(\cot 4x)}\,dx;\ u = \cot 4x$

16) $\int \frac{12\csc -4x\cot -4x}{\sin(\csc -4x)}\,dx;\ u = \csc -4x$

17) $\int \frac{8\csc^2 4x\sin(\cot 4x)}{\cos(\cot 4x)}\,dx;\ u = \cot 4x$

18) $\int \frac{4\sec^2 -x\cos(\tan -x)}{\sin(\tan -x)}\,dx;\ u = \tan -x$

19) $\int \frac{20\csc 5x\cot 5x}{\cos(\csc 5x)}\,dx;\ u = \csc 5x$

20) $\int -\frac{16\sin -4x}{\cos(\cos -4x)}\,dx;\ u = \cos -4x$

Name________________________________


# Calculus Practice: Techniques for Finding Antiderivatives 12b

**Evaluate each indefinite integral. Use the provided substitution.**

1) $\int 2\sec x\tan x\sec^2(\sec x)\,dx;\ \ u = \sec x$

$2\tan(\sec x) + C$

2) $\int 10\csc^2 -2x\sec^2(\cot -2x)\,dx;\ \ u = \cot -2x$

$5\tan(\cot -2x) + C$

3) $\int 6\csc 3x\cot 3x\csc^2(\csc 3x)\,dx;\ \ u = \csc 3x$

$2\cot(\csc 3x) + C$

4) $\int -2\csc^2 x\csc^2(\cot x)\,dx;\ \ u = \cot x$

$-2\cot(\cot x) + C$

5) $\int -10\sin -2x\sec^2(\cos -2x)\,dx;\ \ u = \cos -2x$

$-5\tan(\cos -2x) + C$

6) $\int -12\sec 3x\tan 3x\sec(\sec 3x)\,dx;\ \ u = \sec 3x$

$-4\ln\left|\sec(\sec 3x) + \tan(\sec 3x)\right| + C$

7) $\int -12\cos -4x\tan(\sin -4x)\,dx;\ \ u = \sin -4x$

$3\ln\left|\sec(\sin -4x)\right| + C$

8) $\int 5\sec^2 -x\cot(\tan -x)\,dx;\ \ u = \tan -x$

$-5\ln\left|\sin(\tan -x)\right| + C$

9) $\int 3\sin 3x\csc(\cos 3x)\,dx;\ \ u = \cos 3x$

$-\ln\left|\csc(\cos 3x) - \cot(\cos 3x)\right| + C$

10) $\int 4\cos -4x\tan(\sin -4x)\,dx;\ \ u = \sin -4x$

$-\ln\left|\sec(\sin -4x)\right| + C$

11) $\int -\frac{8\cos 2x}{\sec(\sin 2x)}\,dx;\ \ u = \sin 2x$

$-4\sin(\sin 2x) + C$

12) $\int -\frac{4\sec^2 4x\cos(\tan 4x)}{\sin^2(\tan 4x)}\,dx;\ \ u = \tan 4x$

$\csc(\tan 4x) + C$

13) $\int \frac{3\csc x\cot x}{\sin^2(\csc x)}\,dx;\ \ u = \csc x$

$3\cot(\csc x) + C$

14) $\int \frac{15\csc^2 5x}{\csc(\cot 5x)}\,dx;\ \ u = \cot 5x$

$3\cos(\cot 5x) + C$

15) $\int -\frac{20\csc^2 4x\sin(\cot 4x)}{\cos^2(\cot 4x)}\,dx;\ \ u = \cot 4x$

$5\sec(\cot 4x) + C$

16) $\int \frac{12\csc -4x\cot -4x}{\sin(\csc -4x)}\,dx;\ \ u = \csc -4x$

$3\ln\left|\csc(\csc -4x) - \cot(\csc -4x)\right| + C$

17) $\int \frac{8\csc^2 4x\sin(\cot 4x)}{\cos(\cot 4x)}\,dx;\ \ u = \cot 4x$

$-2\ln\left|\sec(\cot 4x)\right| + C$

18) $\int \frac{4\sec^2 -x\cos(\tan -x)}{\sin(\tan -x)}\,dx;\ \ u = \tan -x$

$-4\ln\left|\sin(\tan -x)\right| + C$

19) $\int \frac{20\csc 5x\cot 5x}{\cos(\csc 5x)}\,dx;\ \ u = \csc 5x$

$-4\ln\left|\sec(\csc 5x) + \tan(\csc 5x)\right| + C$

20) $\int -\frac{16\sin -4x}{\cos(\cos -4x)}\,dx;\ \ u = \cos -4x$

$-4\ln\left|\sec(\cos -4x) + \tan(\cos -4x)\right| + C$