

Integration Practice Worksheet

15 mixed integrals. Step 1: write the method you would use in the 'Method' column before solving anything. Step 2: solve on paper. Step 3: check with the answer key on page 2 — and differentiate your answer to confirm.

#	Integral	My method	Solved? ✓
1	$\int x \sin x \, dx$		
2	$\int 2x/(x^2 + 1) \, dx$		
3	$\int x/[(x + 1)(x + 2)] \, dx$		
4	$\int x^2 e^x \, dx$		
5	$\int x^2/[(x^2 + 1)(x^2 + 4)] \, dx$		
6	$\int \sin x/(1 + \cos x) \, dx$		
7	$\int (x^3 + x + 1)/(x^2 - 1) \, dx$		
8	$\int x \log x \, dx$		
9	$\int (\log x)^2/x \, dx$		
10	$\int (3x - 1)/(x + 2)^2 \, dx$		
11	$\int x \tan^{-1} x \, dx$		
12	$\int e^{\tan^{-1} x}/(1 + x^2) \, dx$		
13	$\int e^x(1/x - 1/x^2) \, dx$		
14	$\int x\sqrt{x + 2} \, dx$		
15	$\int 1/(1 + e^{2x}) \, dx$		

Answer Key

Answers checked by differentiation. If your answer looks different, differentiate it — equivalent forms (e.g. combined logs) are also correct.

#	Integral	Method	Answer
1	$\int x \sin x \, dx$	By parts	$-x \cos x + \sin x + C$
2	$\int 2x/(x^2 + 1) \, dx$	Substitution	$\log(x^2 + 1) + C$
3	$\int x/[(x + 1)(x + 2)] \, dx$	Partial fractions	$-\log x + 1 + 2 \log x + 2 + C$
4	$\int x^2 e^x \, dx$	By parts	$e^x(x^2 - 2x + 2) + C$
5	$\int x^2/[(x^2 + 1)(x^2 + 4)] \, dx$	Partial fractions	$-(1/3) \tan^{-1}x + (2/3) \tan^{-1}(x/2) + C$
6	$\int \sin x/(1 + \cos x) \, dx$	Substitution	$-\log 1 + \cos x + C$
7	$\int (x^3 + x + 1)/(x^2 - 1) \, dx$	Divide, then partial fractions	$x^2/2 + (3/2) \log x - 1 + (1/2) \log x + 1 + C$
8	$\int x \log x \, dx$	By parts	$(x^2/2) \log x - x^2/4 + C$
9	$\int (\log x)^2/x \, dx$	Substitution	$(\log x)^3/3 + C$
10	$\int (3x - 1)/(x + 2)^2 \, dx$	Partial fractions	$3 \log x + 2 + 7/(x + 2) + C$
11	$\int x \tan^{-1}x \, dx$	By parts	$((x^2 + 1)/2) \tan^{-1}x - x/2 + C$
12	$\int e^{\tan^{-1}x}/(1 + x^2) \, dx$	Substitution	$e^{\tan^{-1}x} + C$
13	$\int e^x(1/x - 1/x^2) \, dx$	By parts	$e^x/x + C$
14	$\int x\sqrt{x + 2} \, dx$	Substitution	$(2/5)(x + 2)^{5/2} - (4/3)(x + 2)^{3/2} + C$
15	$\int 1/(1 + e^{2x}) \, dx$	Substitution	$x - (1/2) \log(1 + e^{2x}) + C$

Score: ____ / 15 methods chosen correctly ____ / 15 integrals solved correctly