Integration Techniques
Mixed Review

Find the anti-derivative.

1. $\int x\sqrt{x^2-1}\,dx$
2. $\int (x^2-1)e^x\,dx$
3. $\int \frac{x-28}{x^2-x-6}\,dx$
4. $\int \frac{4x-2}{3(x-1)^2}\,dx$
5. $\int \frac{x^2+2x}{x^3-x^2+x-1}\,dx$
6. $\int \frac{\ln(2x)}{x}\,dx$
7. $\int \frac{x}{x^2-1}\,dx$
8. $\int x\sqrt{x-5}\,dx$
9. $\int x^2 \sin 2x\,dx$
10. $\int \frac{16}{\sqrt{16-x^2}}\,dx$
11. $\int \frac{1}{\sin^2 x - 1}\,dx$
12. $\int \ln\sqrt{x^2-1}\,dx$
13. $\int \arccos(x)\,dx$
14. $\int \frac{5}{x^2+6x+13}\,dx$
15. $\int \frac{(\arccos x)^3}{\sqrt{1-x^2}}\,dx$
16. $\int x\cot^2(x^2)\,dx$
17. $\int \frac{x+2}{\sqrt{4-x^2}}\,dx$

Evaluate.

18. $\int_0^1 \frac{x}{(x-2)(x-4)}\,dx$
19. $\int_0^2 xe^{3x}\,dx$
20. $\int_2^{\sqrt{5}} x(x^2-4)^{3/2}\,dx$

Mixed Review Answers

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

(2) $x^2e^x - 2xe^x + e^x + C$

(3) $\ln|x-3| + 6\ln|x+2| + C$

(4) $\frac{4}{3}\ln|x-1| - \frac{d}{3(x-1)} + C$

(5) $\frac{3}{2}\ln|x-1| - \frac{1}{4}\ln|x^2+1| + \frac{3}{2}\arctan x + C$

(6) $\frac{1}{2}(\ln(2x))^2 + C$

(7) $\frac{1}{2}\ln|x^2-1| + C$

(8) $\frac{2}{5}(x-5)^{5/2} + \frac{10}{3}(x-5)^{3/2} + C$

or

$\frac{2}{5}(x)(x-5)^{3/2} - \frac{4}{15}(x-5)^{5/2} + C$

(9) $-\frac{1}{2}x^2\cos(2x) + \frac{x}{2}\sin(2x) + \frac{1}{4}\cos(2x) + C$

(10) $16\arcsin\frac{x}{4} + C$

(11) $-\tan x + C$

(12) $\frac{1}{2}x\ln|x^2-1| - x - \frac{1}{2}\ln|x-1| + \frac{1}{2}\ln|x+1| + C$

(13) $x\arccos x - \sqrt{1-x^2} + C$

(14) $\frac{5}{2}\arctan\left(\frac{x+3}{2}\right) + C$

(15) $\frac{-1}{4}(\arccos x)^4 + C$

(16) $\frac{1}{2}\cot(x^2) - \frac{1}{2}x^2 + C$

(17) $2\arcsin\frac{x}{2} - \sqrt{4-x^2} + C$

(18) $\ln(9/8)$

(19) $\frac{5}{9}e^6 + \frac{1}{9}$

(20) $1/5$

HINTS

(1) u-substitution
(2) Int. by parts (Tic-Ta
(3) Partial Fractions
(4) Partial Fractions
(5) Partial Fractions
(6) u-substitution
(7) u-substitution
(8) u-sub. or int. by par
(9) int. by parts (Tic-Tac-
(10) Formula
(11) Formula (Pythagorean iden
(12) int. by parts
(13) int. by parts
(14) complete the square
(15) u-substitution
(16) u-substitution
(17) separate the numera
(18) Partial fractions
(19) int. by parts
(20) u-substitution