

201-203-RE - Supplement C - Integration by Partial Fractions

Evaluate the following integrals.

(1) $\int \frac{3x^2 + 11x + 16}{(2x + 3)(x^2 - 1)} dx$	(9) $\int \frac{3x}{x^2 - 6x + 9} dx$	(16) $\int \frac{6x^4 - 12x^3 + 6x^2 + 2x + 1}{(x - 1)^2} dx$
(2) $\int \frac{x^3 - 3x^2 + x - 15}{x^2 - 3x} dx$	(10) $\int \frac{2x^3 - x^2 + 3x + 4}{x^2(x + 1)} dx$	(17) $\int \frac{x^4 + 4x^3 - x + 20}{x^2 + 4x} dx$
(3) $\int \frac{7x^2 - 9x - 2}{x^3 - 2x^2} dx$	(11) $\int \frac{4x^3 + 20x^2 + 14x - 11}{x^2 + 5x + 4} dx$	(18) $\int \frac{12x^4 - 12x^3 + 3x^2 - 8x + 5}{2x^2 + x} dx$
(4) $\int \frac{5 - x}{x^2 + 8x + 15} dx$	(12) $\int \frac{2x^2 - 4x - 12}{x^3 + 3x^2} dx$	(19) $\int \frac{3x^3 - 13x + 6}{x^2 - 4} dx$
(5) $\int \frac{2x^3 + x^2 - 2x - 4}{2x^2 + x} dx$	(13) $\int \frac{4x^2 + 7x + 9}{(x + 3)(x + 1)^2} dx$	(20) $\int \frac{2x^4 + 8x^3 + 3x^2 + 4x + 16}{x^3 + 4x^2} dx$
(6) $\int \frac{2x^3 - 4x^2 - 15x + 5}{x^2 - 2x - 8} dx$	(14) $\int \frac{4x^2 + 23x - 22}{(x + 4)(x - 1)^2} dx$	(21) $\int \frac{8x^4 + 16x^3 - 3x^2 + 2x - 8}{x^2(x + 2)} dx$
(7) $\int \frac{4x^2 + 2x - 1}{x^3 + x^2} dx$	(15) $\int \frac{9x^2 + 59x + 66}{(x - 3)(x + 3)^2} dx$	(22) $\int \frac{5x^3 - 79x - 28}{x^2 - 16} dx$
(8) $\int \frac{x^4}{(x - 1)^3} dx$		

ANSWERS:

(1) $\frac{5}{2} \ln 2x + 3 - 4 \ln x + 1 + 3 \ln x - 1 + C$	(12) $2 \ln x + 3 + \frac{4}{x} + C$
(2) $\frac{1}{2}x^2 + 5 \ln x - 4 \ln x - 3 + C$	(13) $6 \ln x + 3 - 2 \ln x + 1 - \frac{3}{x+1} + C$
(3) $2 \ln x - 2 + 5 \ln x - \frac{1}{x} + C$	(14) $6 \ln x - 1 - \frac{1}{x-1} - 2 \ln x + 4 + C$
(4) $4 \ln x + 3 - 5 \ln x + 5 + C$	(15) $9 \ln x - 3 - \frac{5}{x+3} + C$
(5) $\frac{1}{2}x^2 + 3 \ln 2x + 1 - 4 \ln x + C$	(16) $2x^3 + 2 \ln x - 1 - \frac{3}{x-1} + C$
(6) $x^2 + \frac{3}{2} \ln x - 4 - \frac{1}{2} \ln x + 2 + C$	(17) $\frac{1}{3}x^3 + 5 \ln x - 6 \ln x + 4 + C$
(7) $\frac{1}{x} + \ln x^4 + x^3 + C$	(18) $2x^3 - \frac{9}{2}x^2 + 6x + 5 \ln x - 12 \ln 2x + 1 + C$
(8) $\frac{x^2}{2} + 3x + 6 \ln x - 1 - \frac{4}{x-1} - \frac{1}{2(x-1)^2} + C$	(19) $\frac{3}{2}x^2 - 2 \ln x + 2 + \ln x - 2 + C$
(9) $3 \ln x - 3 - \frac{9}{x-3} + C$	(20) $x^2 - \frac{4}{x} + 3 \ln x + 4 + C$
(10) $2x - \ln x - \frac{4}{x} - 2 \ln x + 1 + C$	(21) $4x^2 + \frac{4}{x} + 3 \ln x - 6 \ln x + 2 + C$
(11) $2x^2 - 3 \ln x + 1 + \ln x + 4 + C$	(22) $\frac{5}{2}x^2 - 3 \ln x - 4 + 4 \ln x + 4 + C$