201-203-RE - Practice Set #7: Integration by Parts

Evaluate the following integrals.

(1) $\int_{-1}^{0} 28x\,(x+2)^6\ dx$

(2) $\int 1760x^2\sqrt[3]{(3-2x)^2}\ dx$

(3) $\int 315x\,(6x-5)^{3/2}\ dx$

(4) $\int_{-2}^{2} 30x\sqrt{5-2x}\ dx$

(5) $\int_{-2}^{0} \frac{12x}{\sqrt{4x+9}}\ dx$

(6) $\int \frac{231x^2}{\sqrt[4]{1-2x}}\ dx$

(7) $\int_{0}^{1} 2(2x-1)e^{2x}\ dx$

(8) $\int (x^2+4)e^{-x}\ dx$

(9) $\int 18x^2\ln(2x)\ dx$

(10) $\int (6x-5)\ln(2x)\ dx$

(11) $\int \frac{x}{1+\sqrt[3]{x^2}}\ dx$

(12) $\int \frac{\sqrt{x}}{\sqrt{x}-6}\ dx$

(13) $\int \frac{30x^2}{\sqrt{x+2}}\ dx$

(14) $\int \frac{18}{3+\sqrt{x}}\ dx$

(15) $\int \frac{35x^3}{\sqrt{2-x}}\ dx$

(16) $\int (2x+5)^2\sqrt{2x-3}\ dx$

(17) $\int (x^2-4x)\,(3-x)^{1/3}\ dx$

(18) $\int x\left(\sqrt{x}+2\right)^2\ dx$

(19) $\int \frac{\ln(4x)}{x^4}\ dx$

(20) $\int (x^2-6x)\sqrt{1-4x}\ dx$

(21) $\int (x+2)^2\,e^{3x}\ dx$

(22) $\int (1-x)^3\sqrt{x+2}\ dx$

(23) $\int \frac{x^2+4}{\sqrt{x+2}}\ dx$

(24) $\int \frac{(x+1)^2}{\sqrt{x-2}}\ dx$

(25) $\int (x^2+3x)\,(3x-1)^{1/2}\ dx$

(26) $\int \frac{x}{\sqrt[3]{x+2}}\ dx$

(27) $\int (24x^2-72x)\ln(3x)\ dx$

(28) $\int \frac{x-2}{\sqrt[4]{x-1}}\ dx$

(29) $\int (6-x)\sqrt{x+3}\ dx$

(30) $\int (3x-x^2)e^{-2x}\ dx$

(31) $\int \frac{x}{\sqrt[3]{x+1}}\ dx$

(32) $\int (x^2-4x)\,(2x-1)^{1/2}\ dx$

(33) $\int (12x^2-36x)\ln(2x)\ dx$

(34) $\int \frac{x-1}{\sqrt[4]{x+1}}\ dx$

ANSWERS:

(1) $-\frac{247}{2}$

(2) $-3(3-2x)^{5/3}(80x^2+90x+81)+C$

(3) $5(6x-5)^{5/2}(3x+1)+C$

(4) -76

(5) -14

(6) $-2(1-2x)^{3/4}(21x^2+12x+8)+C$

(7) 2

(8) $-e^{-x}(x^2+2x+6)+C$

(9) $6x^3\ln(2x)-2x^3+C$

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

(11) $\frac{3}{4}\left(1+x^{2/3}\right)^2-3(1+x^{2/3})+\frac{3}{2}\ln(1+x^{2/3})+C$

(12) $(\sqrt{x}-6)^2+24(\sqrt{x}-6)+72\ln|\sqrt{x}-6|+C$

(13) $4\sqrt{x+2}(3x^2-8x+32)+C$

(14) $36\sqrt{x}-108\ln(3+\sqrt{x})+C$

(15) $-2\sqrt{2-x}(5x^3+12x^2+32x+128)+C$

(16) $\frac{1}{105}(2x-3)^{3/2}(60x^2+492x+1367)+C$

(17) $\frac{-3}{140}(3-x)^{4/3}(14x^2-44x-99)+C$

(18) $\frac{1}{3}x^3+\frac{8}{5}x^{5/2}+2x^2+C$

(19) $-\frac{\ln(4x)}{3x^3}-\frac{1}{9x^3}+C$

(20) $\frac{-1}{420}(1-4x)^{3/2}(30x^2-246x-41)+C$

(21) $\frac{e^{3x}}{27}(9x^2+30x+26)+C$

(22) $\frac{-2}{315}(x+2)^{3/2}(35x^3-195x^2+501x-773)+C$

(23) $\frac{2}{15}\sqrt{x+2}(3x^2-8x+92)+C$

(24) $\frac{2}{5}\sqrt{x-2}(x^2+6x+29)+C$

(25) $\frac{2}{2835}(3x-1)^{3/2}(135x^2+603x+134)+C$

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

(27) $(8x^3-36x^2)\ln(3x)-\frac{8}{3}x^3+18x^2+C$

(28) $\frac{4}{21}(x-1)^{4/3}(3x-10)+C$

(29) $\frac{2}{5}(x+3)^{3/2}(12-x)+C$

(30) $\frac{e^{-2x}}{2}(x^2-2x-1)+C$

(31) $\frac{3}{10}(x+1)^{2/3}(2x-3)+C$

(32) $\frac{1}{105}(2x-1)^{3/2}(15x^2-78x-26)+C$

(33) $(4x^3-18x^2)\ln(2x)-\frac{4}{3}x^3+9x^2+C$

(34) $\frac{4}{21}(x+1)^{3/4}(3x-11)+C$