Assignment: Integration by substitution

Evaluate each indefinite integral. Use the provided substitution.

1) $\displaystyle\int -\frac{15e^{3x}\cos\left(e^{3x}-3\right)}{\sin^2\left(e^{3x}-3\right)}\,dx;\ \ u=e^{3x}-3$

2) $\displaystyle\int \frac{1}{x\cos\left(-2+\ln\,-2x\right)}\,dx;\ \ u=-2+\ln\,-2x$

3) $\displaystyle\int \frac{2}{x\sin^2\left(3+\ln\,3x\right)}\,dx;\ \ u=3+\ln\,3x$

4) $\displaystyle\int \frac{8x}{\sin^2\left(2x^2+1\right)}\,dx;\ \ u=2x^2+1$

5) $\displaystyle\int \frac{9x^2\sin\left(x^3+2\right)}{\cos^2\left(x^3+2\right)}\,dx;\ \ u=x^3+2$

6) $\displaystyle\int -\frac{5e^x}{\cos\left(e^x-1\right)}\,dx;\ \ u=e^x-1$

7) $\displaystyle\int \frac{\sin\left(-5+\ln\,-2x\right)}{x\cos^2\left(-5+\ln\,-2x\right)}\,dx;\ \ u=-5+\ln\,-2x$

8) $\displaystyle\int -\frac{e^x\sin\left(e^x+1\right)}{\cos^2\left(e^x+1\right)}\,dx;\ \ u=e^x+1$

9) $\displaystyle\int \frac{50x^4}{\sec\left(2x^5+3\right)}\,dx;\ \ u=2x^5+3$

10) $\displaystyle\int \frac{12\csc^2\,-3x}{\sin\left(\cot\,-3x\right)}\,dx;\ \ u=\cot\,-3x$

11) $\displaystyle\int \left(2x^3+3\right)^3\cdot 6x^2\,dx;\ \ u=2x^3+3$

12) $\displaystyle\int 15x^2\left(5x^3+4\right)^5\,dx;\ \ u=5x^3+4$

13) $\int 6x(3x^2 + 2)^4 \, dx; \quad u = 3x^2 + 2$

14) $\int (4x^3 - 5)^5 \cdot 12x^2 \, dx; \quad u = 4x^3 - 5$

15) $\int (5x^5 - 3)^3 \cdot 25x^4 \, dx; \quad u = 5x^5 - 3$

16) $\int 2x(x^2 - 2)^5 \, dx; \quad u = x^2 - 2$

17) $\int 8x^3(2x^4 + 3)^5 \, dx; \quad u = 2x^4 + 3$

18) $\int (5x^3 + 3)^3 \cdot 15x^2 \, dx; \quad u = 5x^3 + 3$

19) $\int (x^3 + 5)^5 \cdot 3x^2 \, dx; \quad u = x^3 + 5$

20) $\int (4x^3 + 3)^5 \cdot 12x^2 \, dx; \quad u = 4x^3 + 3$

21) $\int 20x^4(4x^5 + 1)^5 \, dx; \quad u = 4x^5 + 1$

22) $\int (5x^3 - 2)^4 \cdot 15x^2 \, dx; \quad u = 5x^3 - 2$

23) $\int (5x^5 + 4)^3 \cdot 25x^4 \, dx; \quad u = 5x^5 + 4$

24) $\int (4x^2 + 1)^3 \cdot 8x \, dx; \quad u = 4x^2 + 1$

25) $\displaystyle\int 20x^3(5x^4 + 2)^3\, dx;\ \ u = 5x^4 + 2$

26) $\displaystyle\int -\frac{2\cos -2x}{25 + \sin^2 -2x}\, dx;\ \ u = \sin -2x$

27) $\displaystyle\int \frac{1}{x \cdot \ln -3x \cdot \sqrt{(\ln -3x)^2 - 1}}\, dx;\ \ u = \ln -3x$

28) $\displaystyle\int -\frac{4\sec^2 -4x}{\sqrt{9 - \tan^2 -4x}}\, dx;\ \ u = \tan -4x$

29) $\displaystyle\int \frac{1}{x \cdot \ln 2x \cdot \sqrt{(\ln 2x)^2 - 4}}\, dx;\ \ u = \ln 2x$

30) $\displaystyle\int \frac{1}{x \cdot \ln -4x \cdot \sqrt{(\ln -4x)^2 - 25}}\, dx;\ \ u = \ln -4x$

Answers to Assignment: Integration by substitution

1) $5\csc\left(e^{3x} - 3\right) + C$

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

3) $-2\cot\left(3 + \ln 3x\right) + C$

4) $-2\cot\left(2x^2 + 1\right) + C$

5) $3\sec\left(x^3 + 2\right) + C$

6) $-5\ln\left|\sec\left(e^x - 1\right) + \tan\left(e^x - 1\right)\right| + C$

7) $\sec\left(-5 + \ln -2x\right) + C$

8) $-\sec\left(e^x + 1\right) + C$

9) $5\sin\left(2x^5 + 3\right) + C$

10) $4\ln\left|\csc\left(\cot -3x\right) - \cot\left(\cot -3x\right)\right| + C$

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

12) $\frac{1}{6}\left(5x^3 + 4\right)^6 + C$

13) $\frac{1}{5}\left(3x^2 + 2\right)^5 + C$

14) $\frac{1}{6}\left(4x^3 - 5\right)^6 + C$

15) $\frac{1}{4}\left(5x^5 - 3\right)^4 + C$

16) $\frac{1}{6}\left(x^2 - 2\right)^6 + C$

17) $\frac{1}{6}\left(2x^4 + 3\right)^6 + C$

18) $\frac{1}{4}\left(5x^3 + 3\right)^4 + C$

19) $\frac{1}{6}\left(x^3 + 5\right)^6 + C$

20) $\frac{1}{6}\left(4x^3 + 3\right)^6 + C$

21) $\frac{1}{6}\left(4x^5 + 1\right)^6 + C$

22) $\frac{1}{5}\left(5x^3 - 2\right)^5 + C$

23) $\frac{1}{4}\left(5x^5 + 4\right)^4 + C$

24) $\frac{1}{4}\left(4x^2 + 1\right)^4 + C$

25) $\frac{1}{4}\left(5x^4 + 2\right)^4 + C$

26) $\frac{1}{5}\cdot\tan^{-1}\frac{\sin -2x}{5} + C$

27) $\sec^{-1}\left|\ln -3x\right| + C$

28) $\sin^{-1}\frac{\tan -4x}{3} + C$

29) $\frac{1}{2}\cdot\sec^{-1}\frac{\left|\ln 2x\right|}{2} + C$

30) $\frac{1}{5}\cdot\sec^{-1}\frac{\left|\ln -4x\right|}{5} + C$