Calculus Practice: Techniques for Finding Antiderivatives 3a

Evaluate each indefinite integral. Use the provided substitution.

1) $\int 4e^{2r} \cdot (e^{2r}+1)^3 \, dr;\ u = e^{2r}+1$

A) $\frac{1}{2}(e^{2r}+1)^6 + C$

B) $\frac{3}{4}(e^{2r}+1)^4 + C$

C) $\frac{4}{5}(e^{2r}+1)^5 + C$

D) $\frac{1}{2}(e^{2r}+1)^4 + C$

2) $\int (e^{5t}+1)^5 \cdot 15e^{5t} \, dt;\ u = e^{5t}+1$

A) $\frac{1}{2}(e^{5t}+1)^6 + C$

B) $\frac{3}{4}(e^{5t}+1)^4 + C$

C) $\frac{1}{2}(e^{5t}+1)^4 + C$

D) $\frac{5}{6}(e^{5t}+1)^6 + C$

3) $\int 10e^{5t} \cdot (e^{5t}+5)^5 \, dt;\ u = e^{5t}+5$

A) $\frac{3}{5}(e^{5t}+5)^5 + C$

B) $\frac{3}{4}(e^{5t}+5)^4 + C$

C) $\frac{1}{3}(e^{5t}+5)^6 + C$

D) $\frac{1}{2}(e^{5t}+5)^4 + C$

4) $\int 15e^{3x} \cdot (e^{3x}-3)^3 \, dx;\ u = e^{3x}-3$

A) $\frac{5}{4}(e^{3x}-3)^4 + C$

B) $(e^{3x}-3)^4 + C$

C) $(e^{3x}-3)^5 + C$

D) $\frac{4}{5}(e^{3x}-3)^5 + C$

5) $\int 6e^{2x} \cdot (e^{2x}+1)^{-3} \, dx;\ u = e^{2x}+1$

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

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

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

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

6) $\int \frac{20e^{5x}}{(e^{5x}-3)^3} \, dx;\ u = e^{5x}-3$

A) $-\frac{1}{(e^{5x}-3)^2} + C$

B) $-\frac{3}{2(e^{5x}-3)^2} + C$

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

D) $-\frac{1}{(e^{5x}-3)^4} + C$

7) $\int \left(e^{2x}-3\right)^{-4} \cdot 10e^{2x}\,dx;\ u = e^{2x}-3$

A) $-\frac{3}{2\left(e^{2x}-3\right)^{2}}+C$

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

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

D) $-\frac{2}{3\left(e^{2x}-3\right)^{3}}+C$

8) $\int \frac{20e^{4x}}{\left(e^{4x}-3\right)^{5}}\,dx;\ u = e^{4x}-3$

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

B) $-\frac{3}{2\left(e^{4x}-3\right)^{2}}+C$

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

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

9) $\int 6e^{2x} \cdot \left(e^{2x}-1\right)^{\frac{1}{2}}\,dx;\ u = e^{2x}-1$

A) $\frac{12}{5}\left(e^{2x}-1\right)^{\frac{5}{4}}+C$

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

C) $\frac{8}{3}\left(e^{2x}-1\right)^{\frac{3}{2}}+C$

D) $\frac{15}{8}\left(e^{2x}-1\right)^{\frac{8}{5}}+C$

10) $\int 8e^{4x}\sqrt{e^{4x}-1}\,dx;\ u = e^{4x}-1$

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

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

C) $\frac{9}{4}\left(e^{4x}-1\right)^{\frac{4}{3}}+C$

D) $\frac{10}{3}\left(e^{4x}-1\right)^{\frac{3}{2}}+C$

11) $\int 12e^{4x}\sqrt{e^{4x}+2}\,dx;\ u = e^{4x}+2$

A) $\frac{8}{3}\left(e^{4x}+2\right)^{\frac{3}{2}}+C$

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

C) $\frac{9}{4}\left(e^{4x}+2\right)^{\frac{4}{3}}+C$

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

12) $\int \left(e^{5x}+1\right)^{\frac{1}{4}} \cdot 20e^{5x}\,dx;\ u = e^{5x}+1$

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

B) $\frac{16}{5}\left(e^{5x}+1\right)^{\frac{5}{4}}+C$

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

D) $\frac{20}{7}\left(e^{5x}+1\right)^{\frac{7}{4}}+C$

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B) $\frac{3}{4}\left(e^{2r}+1\right)^4 + C$

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

*D) $\frac{1}{2}\left(e^{2r}+1\right)^4 + C$

2) $\int \left(e^{5t}+1\right)^5 \cdot 15e^{5t} \, dt;\ u = e^{5t}+1$

*A) $\frac{1}{2}\left(e^{5t}+1\right)^6 + C$

B) $\frac{3}{4}\left(e^{5t}+1\right)^4 + C$

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

D) $\frac{5}{6}\left(e^{5t}+1\right)^6 + C$

3) $\int 10e^{5t} \cdot \left(e^{5t}+5\right)^5 \, dt;\ u = e^{5t}+5$

A) $\frac{3}{5}\left(e^{5t}+5\right)^5 + C$

B) $\frac{3}{4}\left(e^{5t}+5\right)^4 + C$

*C) $\frac{1}{3}\left(e^{5t}+5\right)^6 + C$

D) $\frac{1}{2}\left(e^{5t}+5\right)^4 + C$

4) $\int 15e^{3x} \cdot \left(e^{3x}-3\right)^3 \, dx;\ u = e^{3x}-3$

*A) $\frac{5}{4}\left(e^{3x}-3\right)^4 + C$

B) $\left(e^{3x}-3\right)^4 + C$

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

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

5) $\int 6e^{2x} \cdot \left(e^{2x}+1\right)^{-3} \, dx;\ u = e^{2x}+1$

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

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

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

*D) $-\frac{3}{2\left(e^{2x}+1\right)^2} + C$

6) $\int \frac{20e^{5x}}{\left(e^{5x}-3\right)^3} \, dx;\ u = e^{5x}-3$

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

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

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

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

7) $\int (e^{2x} - 3)^{-4} \cdot 10e^{2x}\, dx;\ u = e^{2x} - 3$

A) $-\frac{3}{2(e^{2x} - 3)^2} + C$

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

*C) $-\frac{5}{3(e^{2x} - 3)^3} + C$

D) $-\frac{2}{3(e^{2x} - 3)^3} + C$

8) $\int \frac{20e^{4x}}{(e^{4x} - 3)^5}\, dx;\ u = e^{4x} - 3$

*A) $-\frac{5}{4(e^{4x} - 3)^4} + C$

B) $-\frac{3}{2(e^{4x} - 3)^2} + C$

C) $-\frac{2}{(e^{4x} - 3)^2} + C$

D) $-\frac{1}{2(e^{4x} - 3)^4} + C$

9) $\int 6e^{2x} \cdot (e^{2x} - 1)^{\frac{1}{2}}\, dx;\ u = e^{2x} - 1$

A) $\frac{12}{5}(e^{2x} - 1)^{\frac{5}{4}} + C$

*B) $2(e^{2x} - 1)^{\frac{3}{2}} + C$

C) $\frac{8}{3}(e^{2x} - 1)^{\frac{3}{2}} + C$

D) $\frac{15}{8}(e^{2x} - 1)^{\frac{8}{5}} + C$

10) $\int 8e^{4x}\sqrt{e^{4x} - 1}\, dx;\ u = e^{4x} - 1$

*A) $\frac{4}{3}(e^{4x} - 1)^{\frac{3}{2}} + C$

B) $\frac{3}{2}(e^{4x} - 1)^{\frac{4}{3}} + C$

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

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