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Calculus Practice: Techniques for Finding Antiderivatives 14a

Evaluate each indefinite integral. Use the provided substitution.

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

A) $\sin^{-1} \frac{\ln -4x}{4} + C$

B) $\sin^{-1} \frac{\ln -4x}{5} + C$

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

D) $\tan^{-1} \ln -4x + C$

2) $\int \frac{1}{x\left(9 + (\ln 5x)^2\right)}\, dx;\ u = \ln 5x$

A) $\frac{1}{3} \cdot \tan^{-1} \frac{\ln 5x}{3} + C$

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

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

D) $\sin^{-1} \frac{\ln 5x}{2} + C$

3) $\int \frac{1}{x\sqrt{9 - (\ln x)^2}}\, dx;\ u = \ln x$

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

B) $\sin^{-1} \frac{\ln x}{3} + C$

C) $\sin^{-1} \ln x + C$

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

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

A) $\frac{1}{3} \cdot \sec^{-1} \frac{\left|\ln 2x\right|}{3} + C$

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

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

D) $\tan^{-1} \ln 2x + C$

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

A) $\frac{1}{4} \cdot \tan^{-1} \frac{\ln 2x}{4} + C$

B) $\sin^{-1} \frac{\ln 2x}{3} + C$

C) $\frac{1}{3} \cdot \sec^{-1} \frac{\left|\ln 2x\right|}{3} + C$

D) $\frac{1}{2} \cdot \tan^{-1} \frac{\ln 2x}{2} + C$

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

A) $\sin^{-1} \frac{\ln x}{5} + C$

B) $\sin^{-1} \ln x + C$

C) $\frac{1}{5} \cdot \tan^{-1} \frac{\ln x}{5} + C$

D) $\tan^{-1} \ln x + C$

7) $\int \frac{1}{x \cdot \ln 5x \cdot \sqrt{(\ln 5x)^2 - 1}}\, dx;\ u = \ln 5x$

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

B) $\frac{1}{3} \cdot \sec^{-1} \frac{\left|\ln 5x\right|}{3} + C$

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

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

8) $\int \frac{1}{x\left(25 + (\ln 3x)^2\right)}\, dx;\ u = \ln 3x$

A) $\sin^{-1} \frac{\ln 3x}{3} + C$

B) $\frac{1}{5} \cdot \tan^{-1} \frac{\ln 3x}{5} + C$

C) $\frac{1}{2} \cdot \sec^{-1} \frac{\left|\ln 3x\right|}{2} + C$

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

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

A) $\sin^{-1} \dfrac{\ln -2x}{4} + C$

B) $\dfrac{1}{5} \cdot \sec^{-1} \dfrac{\left|\ln -2x\right|}{5} + C$

C) $\dfrac{1}{4} \cdot \tan^{-1} \dfrac{\ln -2x}{4} + C$

D) $\tan^{-1} \ln -2x + C$

10) $\displaystyle\int \frac{1}{x\left(25+(\ln 5x)^2\right)}\,dx;\ \ u=\ln 5x$

A) $\sec^{-1} \left|\ln 5x\right| + C$

B) $\sin^{-1} \dfrac{\ln 5x}{5} + C$

C) $\dfrac{1}{5} \cdot \tan^{-1} \dfrac{\ln 5x}{5} + C$

D) $\sin^{-1} \dfrac{\ln 5x}{2} + C$

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

A) $\dfrac{1}{5} \cdot \tan^{-1} \dfrac{\ln -2x}{5} + C$

B) $\dfrac{1}{4} \cdot \sec^{-1} \dfrac{\left|\ln -2x\right|}{4} + C$

C) $\sin^{-1} \dfrac{\ln -2x}{3} + C$

D) $\sin^{-1} \ln -2x + C$

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

A) $\dfrac{1}{5} \cdot \sec^{-1} \dfrac{\left|\ln -x\right|}{5} + C$

B) $\sin^{-1} \dfrac{\ln -x}{2} + C$

C) $\tan^{-1} \ln -x + C$

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D) $\sin^{-1} \dfrac{\ln -2x}{3} + C$

14) $\displaystyle\int \frac{1}{x\left(16+(\ln -x)^2\right)}\,dx;\ \ u=\ln -x$

A) $\sin^{-1} \dfrac{\ln -x}{5} + C$

B) $\dfrac{1}{4} \cdot \tan^{-1} \dfrac{\ln -x}{4} + C$

C) $\sin^{-1} \dfrac{\ln -x}{3} + C$

D) $\dfrac{1}{3} \cdot \tan^{-1} \dfrac{\ln -x}{3} + C$

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A) $\sin^{-1} \dfrac{\ln -3x}{4} + C$

B) $\tan^{-1} \ln -3x + C$

C) $\dfrac{1}{2} \cdot \tan^{-1} \dfrac{\ln -3x}{2} + C$

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

16) $\displaystyle\int \frac{1}{x\sqrt{16-(\ln -3x)^2}}\,dx;\ \ u=\ln -3x$

A) $\dfrac{1}{2} \cdot \tan^{-1} \dfrac{\ln -3x}{2} + C$

B) $\dfrac{1}{4} \cdot \tan^{-1} \dfrac{\ln -3x}{4} + C$

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