6.14 / Practice workbook

Selecting Techniques for Antidifferentiation

Practice

Problems 1–8 / Show your reasoning

1 Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} 2\cot x\,dx$.

2 $\int \frac{\cos x}{1+\sin x}\,dx =$

A. $\ln|1+\sin x| + C$

B. $\arctan(\sin x) + C$

C. $\frac{\sin x}{x+\cos x} + C$

D. $-\ln|1+\sin x| + C$

3 Find $\int \frac{3x-1}{x^2+1}\,dx$.

4 Which integral is equal to $\arctan(x+2) + C$?

A. $\int \frac{1}{x^2+4x+5}\,dx$

B. $\int \frac{2x+4}{x^2+4x+5}\,dx$

C. $\int \frac{1}{(x+2)^2}\,dx$

D. $\int \frac{x}{x^2+4x+5}\,dx$

5 Evaluate each integral.

(a) $\int_0^2 \frac{x}{x^2+4}\,dx$

(b) $\int_0^2 \frac{x^3}{x^2+4}\,dx$

6.14 / AP-style free response

Problem 6 ➤ */ Show the work and the reasons a grader looks for.*

Find $\int \frac{\sin x}{\cos^2 x}\,dx$.

7 Find $\int \left(2+\sqrt{x}\right)^2 dx$.

8 $\int_0^{\ln 2} \frac{e^x}{1+e^x} dx =$

A. $\ln \frac{3}{2}$
B. $\ln 3$
C. $\ln 2$
D. $\frac{1}{2}$

6.14 / Answer key

Selecting Techniques for Antidifferentiation

1 $2 \ln 2$

2 (A)

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

4 (A)

5 (a) $\frac{\ln 2}{2}$; (b) $2 - 2 \ln 2$

6 $\sec x + C$

7 $4x + \frac{8}{3} x^{\frac{3}{2}} + \frac{x^2}{2} + C$

8 (A)