6.8 / Practice workbook

Finding Antiderivatives and Indefinite Integrals: Basic Rules and Notation

Practice

Problems 1–6 / Show your reasoning

1 Find $\int \left(6x^2 - 4x + 5\right) dx$.

2 $\int (3\cos x - 2e^x)\, dx =$

A. $3\sin x - 2e^x + C$
B. $-3\sin x - 2e^x + C$
C. $3\sin x - 2xe^{x-1} + C$
D. $-3\sin x + 2e^x + C$

3 Find $\int \dfrac{x^3 - 2}{x}\, dx$.

4 If $f'(x) = 2\sec^2 x - \sin x$ and $f(0) = 3$, then $f\left(\dfrac{\pi}{4}\right) =$

A. $4 + \dfrac{\sqrt{2}}{2}$
B. $2 + \dfrac{\sqrt{2}}{2}$
C. $6 - \dfrac{\sqrt{2}}{2}$
D. $3 + \dfrac{\sqrt{2}}{2}$

5 A function f has $f''(x) = 6x - 4$, $f'(1) = 2$, and $f(1) = 3$.

(a) Find $f'(x)$.

(b) Find $f(x)$.

(c) Find $f(2)$.

6 If $F'(x) = \dfrac{1}{x}$ for $x < 0$ and $F(-1) = 2$, then $F(-e) =$

A. 1
B. 3
C. $2 - e$
D. undefined

6.8 / Answer key

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P01 $\int 6x^2\,dx = 2x^3$, $\int (-4x)\,dx = -2x^2$, $\int 5\,dx = 5x$

$\int (6x^2 - 4x + 5)\,dx = 2x^3 - 2x^2 + 5x + C$

P02 (A) $\int 3\cos x\,dx = 3\sin x$, $\int 2e^x\,dx = 2e^x$

$\int (3\cos x - 2e^x)\,dx = 3\sin x - 2e^x + C$

Answer A.

P03 $\dfrac{x^3 - 2}{x} = x^2 - \dfrac{2}{x}$

$\int \left(x^2 - \dfrac{2}{x}\right)dx = \dfrac{x^3}{3} - 2\ln|x| + C$

P04 (A) $f(x) = 2\tan x + \cos x + C$

$f(0) = 0 + 1 + C = 3 \;\rightarrow\; C = 2$

$f\left(\dfrac{\pi}{4}\right) = 2 + \dfrac{\sqrt{2}}{2} + 2 = 4 + \dfrac{\sqrt{2}}{2}$

Answer A.

P05 $f'(x) = 3x^2 - 4x + C_1$, $3 - 4 + C_1 = 2 \;\rightarrow\; C_1 = 3$

$f(x) = x^3 - 2x^2 + 3x + C_2$, $1 - 2 + 3 + C_2 = 3 \;\rightarrow\; C_2 = 1$

$f(2) = 8 - 8 + 6 + 1 = 7$

P06 (B) $F(x) = \ln|x| + C \quad (x < 0)$

$F(-1) = \ln 1 + C = 2 \;\rightarrow\; C = 2$

$F(-e) = \ln e + 2 = 3$

Answer B.