

경영·경제분석을 위한 핵심 수학(6판)

연습문제 풀이 이용 안내

- 본 문제 풀이의 저작권은 원서 저작권자(Knut Sydsæter, Arne Strøm, Peter Hammond, Andrés Carvajal)와 Pearson, 한빛아카데미(주)에 있습니다.
- 이 자료를 무단으로 전제하거나 배포할 경우 저작권법 136조에 의거하여 최고 5년 이하의 징역 또는 5천만원 이하의 벌금에 처할 수 있고 이를 병과(併科)할 수도 있습니다.

CHAPTER 10 적분

10.1 부정적분

1.

(a) $\frac{1}{14}x^{14} + C$

(b) $\frac{2}{5}x^{5/2} + C$

(c) $2\sqrt{x} + C$

(d) $\frac{8}{15}x^{15/8} + C$

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

(f) $4e^{\frac{x}{4}} + C$

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

(h) $\frac{1}{\ln 2}2^x + C$

2.

(a) $C(x) = \frac{3}{2}x^2 + 4x + 40$

(b) $C(x) = \frac{1}{2}a^x + bx + C_0$

3.

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

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

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

(d) $\frac{1}{4}(x+2)^4 + C$

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

(f) $\frac{1}{3}x^3 - 3x + 4\ln|x| + C$

4.

(a) $\frac{2}{5}y^2\sqrt{y} - \frac{8}{3}y\sqrt{y} + 8\sqrt{y} + C$

(b) $\frac{1}{3}x^3 - \frac{1}{2}x^2 + x - \ln|x+1| + C$

(c) $\frac{1}{32}(1+x^2)^{16} + C$

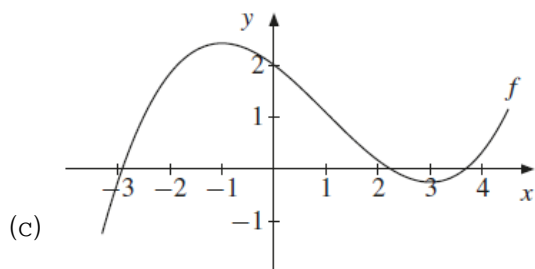
5.

증명 생략

6.

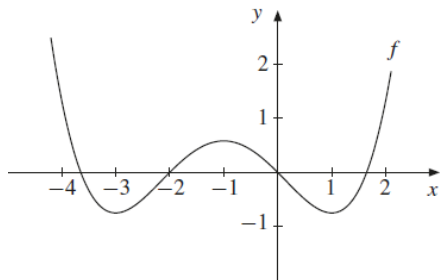
(a) $f'(x) = A(x+1)(x-3)$

(b) $f(x) = \frac{1}{12}x^3 - \frac{1}{4}x^2 - \frac{3}{4}x + 2$



CHAPTER 10 적분

7.



$$f(x) = \frac{1}{12}x^4 + \frac{1}{3}x^3 - \frac{1}{6}x^2 - x$$

8.

증명 생략

9.

증명 생략

10.

$$(a) \frac{1}{10}(2x+1)^5 + C$$

$$(b) \frac{2}{3}(x+2)^{\frac{3}{2}} + C$$

$$(c) -2\sqrt{4-x} + C$$

11.

$$(a) F(x) = \frac{1}{2}e^x - x^2$$

$$(b) F(x) = \frac{1}{2}x^2 - \frac{1}{4}x^4 + \frac{1}{6}$$

12.

$$f(x) = \frac{1}{12}x^4 + Ax + B$$

$$f(x) = (1/12)x^4 - x + 1$$

13.

$$f(x) = -\ln x + \frac{1}{20}x^5 + x^2 - x - \frac{1}{20}$$

CHAPTER 10 적분

10.2 넓이와 정적분

1.

(a) $\frac{1}{4}$

(b) $\frac{1}{11}$

2.

(a) 8

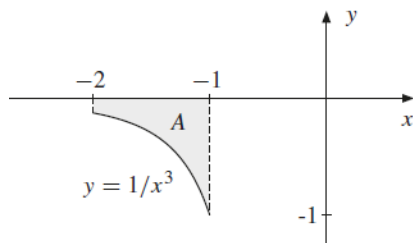
(b) $\frac{1}{7}$

(c) $e - \frac{1}{e}$

(d) $\frac{9}{10}$

3.

$\frac{3}{8}$



4.

$e - e^{-1}$

5.

(a) $\frac{1}{2}$

(b) $\frac{16}{3}$

(c) $\frac{5}{12}$

(d) $-\frac{12}{5}$

(e) $\frac{41}{2}$

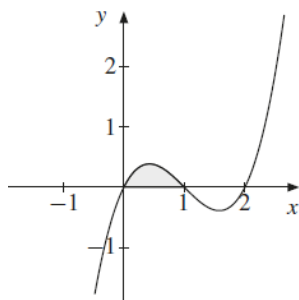
(f) $\ln 2 + \frac{5}{2}$

6.

(a) $f'(x) = 3x^2 - 6x + 2$

$\left(-\infty, 1 - \frac{1}{3}\sqrt{3}\right] \cup \left[1 + \frac{1}{3}\sqrt{3}, \infty\right)$

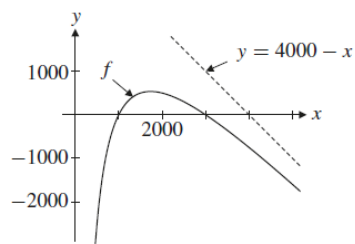
(b) $\frac{1}{4}$



CHAPTER 10 적분

7.

(a) $1000\sqrt{3}$



(b) $I = 2000 - 1500 \ln 3 \approx 352$

8.

(a) $\frac{6}{5}$

(b) $\frac{26}{3}$

(c) $\frac{\alpha(e^\beta - 1)}{\beta}$

(d) $-\ln 2$

CHAPTER 10 적분

10.3 정적분의 성질

1.

(a) $\frac{325}{6}$

(b) 0

(c) $\ln 9$

(d) $e - 1$

(e) -136

(f) $\frac{687}{64}$

(g) $\frac{8}{3}$

(h) 2

2.

4

3.

$\frac{11}{2}$

4.

$\frac{1}{p+q+1} + \frac{1}{p+r+1}$

5.

$f(x) = 4x^3 - 3x^2 + 5$

6.

(a) $\frac{1}{9}(e^7 - e^{-2}) + \ln\left(\frac{5}{2}\right)$

(b) $\frac{83}{15}$

(c) $2\sqrt{2} - \frac{3}{2}$

(d) $A\left\{b-1 + (b-c)\ln\frac{b+c}{1+c}\right\} + d\ln b$

7.

$F'(x) = x^2 + 2, \quad G'(x) = 2x^5 + 4x$

8.

$H'(t) = 2tK(t^2)e^{-\rho t^2}$

9.

(a) t^2

(b) $-e^{-t^2}$

(c) $\frac{2}{\sqrt{t^4+1}}$

(d) $f(-\lambda) - g(-\lambda)$

10.

6

11.

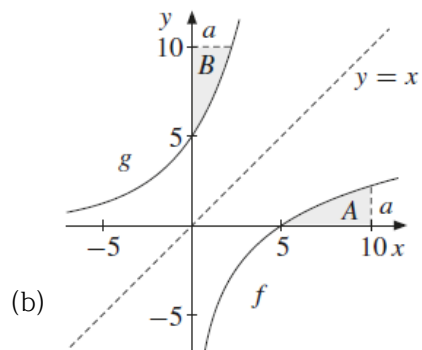
$W(T) = \frac{K(1 - e^{-\rho T})}{\rho T}$

증명 생략

CHAPTER 10 적분

12.

(a) $g(x) = e^{\frac{x}{2}} + 4e^{\frac{x}{4}}$



(c) $A = 10a - 2e^{\frac{a}{2}} - 16e^{\frac{a}{4}} + 18$

CHAPTER 10 적분

10.4 경제학에의 응용

1.

$$x(t) = K - \frac{\bar{u}(1 - e^{-at})}{a}$$

$$\lim_{t \rightarrow \infty} x(t) = K - \frac{\bar{u}}{a}$$

2.

(a) $m = 2b \ln 2$

(b) $x(p) = \frac{nABp^\gamma b^{\delta-1}(2^{\delta-1} - 1)}{\delta - 1}$

3.

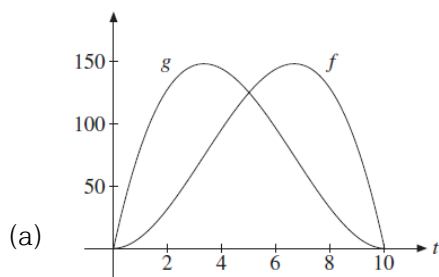
$$T = \frac{1}{r} \ln(1 + rS)$$

4.

(a) 175

(b) $K(T) - K_0 = (T^3 - t_0^3) + (T^2 - t_0^2) + 5(T - t_0)$

5.



(b) 증명 생략

(c) 프로파일 g

6.

균형가격 80, 균형수량 600, CS 36,000, PS 18,000

7.

균형가격 60, 균형수량 50, CS $6000 \ln 2 - 3000$, PS 1,250

CHAPTER 10 적분

10.5 부분적분

1.

(a) $-xe^{-x} - e^{-x} + C$

(b) $\frac{3}{4}xe^{4x} - \frac{3}{16}e^{4x} + C$

(c) $-x^2e^{-x} - 2xe^{-x} - 3e^{-x} + C$

(d) $\frac{1}{2}x^2 \ln x - \frac{1}{4}x^2 + C$

2.

(a) $2 - \frac{3}{2} \ln 3$

(b) $\frac{8}{\ln 2} - \frac{3}{(\ln 2)^2}$

(c) $e - 2$

(d) $\frac{116}{15}$

3.

(a) $\frac{16}{3} \ln 4 - \frac{28}{9}$

(b) $-4e^{-1}$

(c) $\frac{26}{(\ln 3)^2} - \frac{3}{\ln 3}$

4.

증명 생략

5.

증명 생략

6.

(a) $br^{-2}\{1 - (1 + rT)e^{-rT}\}$

(b) $ar^{-1}(1 - e^{-rT}) + br^{-2}\{1 - (1 + rT)e^{-rT}\}$

(c) $ar^{-1}(1 - e^{-rT}) - br^{-2}\{1 - (1 + rT)e^{-rT}\} + cr^{-3}\{2(1 - e^{-rT}) - 2rTe^{-rT} - r^2T^2e^{-rT}\}$

CHAPTER 10 적분

10.6 치환적분

1.

(a) $\frac{1}{9}(x^2 + 1)^9 + C$

(b) $\frac{1}{11}(x+2)^{11} + C$

(c) $\ln|x^2 - x + 8| + C$

2.

(a) $\frac{1}{24}(2x^2 + 3)^6 + C$

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

(c) $\frac{1}{4}\{\ln(x+2)\}^2 + C$

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

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

(f) $\frac{2}{15}(4-x^3)^{\frac{5}{2}} - \frac{8}{9}(4-x^3)^{\frac{3}{2}} + C$

3.

(a) $\frac{1}{3}(2\sqrt{2}-1)$

(b) $\frac{1}{2}$

(c) $\frac{1}{2}(e^2 - e^{2/3})$

(d) $3 + 4\ln 4$

4.

$x = 3$

5.

증명 생략

6.

(a) $\frac{1}{70}$

(b) $2\sqrt{x}\ln x - 4\sqrt{x} + C$

(c) $\frac{8}{3}$

7.

(a) $2\ln(1+e^2) - 2\ln(1+e)$

(b) $\ln 2 - \ln(e^{-\frac{1}{3}} + 1)$

(c) $7 + 2\ln 2$

8.

$I = -\frac{6}{7}x^{\frac{7}{6}} - \frac{6}{5}x^{\frac{5}{6}} - 2x^{\frac{1}{2}} - 6x^{\frac{1}{6}} - 3\ln|1-x^{\frac{1}{6}}| + 3\ln|1+x^{\frac{1}{6}}| + C$

9.

$f(x) = \frac{1}{a-b} \left(\frac{ac+d}{x-a} - \frac{bc+d}{x-b} \right)$

(a) $-\ln|x+1| + 2\ln|x+2| + C$

(b) $-\frac{7}{8}\ln|x+3| - \frac{9}{8}\ln|x-5| + C$

CHAPTER 10 적분

10.7 이상적분

1.

(a) $\frac{1}{2}$

(b) 발산

(c) 1

(d) a

2.

(a) 1

(b) $\frac{1}{2}(a+b)$

(c) $\frac{1}{3}(a^2+ab+b^2)$

3.

(a) $\frac{1}{\lambda}$

(b) $\frac{1}{\lambda^2}$

(c) $\frac{2}{\lambda^3}$

4.

증명 생략

5.

(a) $x = e^{\frac{1}{3}}$ (최대점)

(b) $\int_0^1 x^{-3} \ln x \, dx$ (발산), $\int_1^\infty x^{-3} \ln x \, dx = \frac{1}{4}$ (수렴)

6.

증명 생략

7.

증명 생략

8.

(a) $\frac{1-e^{-r\tau}}{r\tau}$

(b) $\frac{2}{r\tau} \left\{ 1 - \frac{1}{r\tau} (1 - e^{-r\tau}) \right\}$

9.

단순 계산으로는 $\int_{-1}^1 \frac{1}{x^2} \, dx = -2$ 이지만 실제 ∞ 로 발산한다.

10.

증명 생략

-4

증명 생략

1

12.

증명 생략

CHAPTER 10 적분

CHAPTER 10 복습문제

10.1

(a) $-16x + C$

(b) $5^5 x + C$

(c) $3y - \frac{1}{2}y^2 + C$

(d) $\frac{1}{2}r^2 - \frac{16}{5}r^{\frac{5}{4}} + C$

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

(f) $\frac{2}{7}x^{\frac{7}{2}} + C$

(g) $-\frac{1}{4}p^{-4} + C$

(h) $\frac{1}{4}x^4 + \frac{1}{2}x^2 + C$

10.2

(a) $e^{2x} + C$

(b) $\frac{1}{2}x^2 - \frac{25}{2}e^{\frac{2x}{5}} + C$

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

(d) $2\ln|x+5| + C$

10.3

(a) 600

(b) $\frac{2}{3}$

(c) 24

(d) $2\ln 5$

(e) $3\ln\left(\frac{8}{3}\right)$

(f) $\frac{98}{3}$

10.4

(a) $\frac{5}{4}$

(b) $\frac{31}{20}$

(c) -5

(d) $e - 2$

(e) $\frac{52}{9}$

(f) $\frac{1}{3}\ln\left(\frac{6}{5}\right)$

(g) $\frac{1}{256}(3e^4 + 1)$

(h) $2e^{-1}$

10.5

(a) $10 - 18\ln\left(\frac{14}{9}\right)$

(b) $\frac{886}{15}$

(c) $\frac{195}{4}$

10.6

(a) $F'(x) = 4(\sqrt{x} - 1)$

(b) $F'(x) = \ln x - \frac{\ln x}{4\sqrt{x}}$

10.7

$C(Y) = 0.69Y + 1000$

10.8

$C(x) = \frac{\alpha}{\beta}(e^{\beta x} - 1) + \gamma x + C_0$

10.9

CHAPTER 10 적분

10.10

(a) 균형가격 70, 균형수량 600, CS 9,000, PS 18,000

(b) 균형가격 5, 균형수량 5, CS $50\ln 2 - 25$, PS 1.25

10.11

(a) $f'(t) = \frac{4\ln t(2 - \ln t)}{t^2}$

$$f''(t) = \frac{8\{(\ln t)^2 - 3\ln t + 1\}}{t^3}$$

(b) $x = e^2$ (극대점), $x = 1$ (극소점)

(c) $\frac{32}{3}$

10.12

(a) 증명 생략

(b) $x(p) = n(am - bp)$