Section 1.1 확인문제

1. (a) OOOO (b) OXOX

2. 6

3. (a) 1 (b) $-3+5\sqrt{2}$

4. (a) 2 (b) $2x$

5. $A < C < B$

6. $a-3b$

7. $x=2,\ y=6$

8. 0

9. 0

10. 생략

11. $-4,\ -2,\ 0,\ 2,\ 4$

Section 1.2 확인문제

1. (a) $2x^2-4x+4,\ -6x+8$

   (b) $-2x^2+2x+1,\ 4x^2-6x-5$

   (c) $2x^2+5y^2-2xy+2x-16y+13,\ -3y^2+6xy-10x+8y-5$

2. (a) $4a^2+b^2+c^2-4ab-2bc+4ac$

   (b) $a^4-2a^2b+2a^2+b^2-2b$

   (c) $a^4-2a^3-13a^2+14a+24$

3. (a) 6 (b) $\pm 2\sqrt{2}$ (c) 14 (d) 34

4. (a) $(a-1)(a-2)$

   (b) $(a-3)^2$

   (c) $(a-1)(a+1)(a-\sqrt{2}\,)(a+\sqrt{2}\,)$

   (d) $(a^2-2a+3)(a^2+2a+3)$

5. (a) $(a+2b+1)(a-b-1)$ (b) $(a+b-1)(a+b+3)$

   (c) $(a-b)(ab-bc-ca)$ (d) $(a-b)(a-b+1)$

6. (a) $(x-1)(x+1)(x+3)(x+5)$ (b) $(x-1)(x+1)(x^2+4)$

7. $a=-5,\ b=10$ x^2+2x+5

8. $a=b=5$

9. $\sqrt{2}+\sqrt{3}$

10. 빗변이 길이가 b인 직각삼각형

Section 1.3 확인문제

1. -2

2. (a) $a \neq 2$이면 $x = -\dfrac{a+3}{a-2}$

(b) $a \neq 0,\ a \neq 1$이면 $x = \dfrac{1}{a}$

3. 3

4. (a) $-3,\ 1$ (b) -2

5. (a) $-4,\ 2$ (b) $-1 \pm \sqrt{3}\, i$

6. (a) $1,\ \dfrac{-1 \pm \sqrt{7}\, i}{2}$ (b) $\pm 1,\ \pm \sqrt{2}$

7. (a) $a < \dfrac{1}{2}$ (b) $a = \dfrac{1}{2}$ (c) $a > \dfrac{1}{2}$

Chapter 01. 연습문제

1. 3

2. 4

3. 2

4. $4a^2-12ab+9b^2$

5. a^3-4a^2+a+6

6. 18

7. $\frac{65}{9}$

8. $(a-b)(a+b)(a^2+b^2)$

9. $(a-b)(a^2+ab+b^2)(a^6+a^3b^3+b^6)$

10. $(x-a)(x-a+1)$

11. $(a+3b-c)(a+3b+c)$

12. $(x+4)(x+2)(x-1)(x-3)$

13. $(x+1)(x-2)(x-3)(2x-1)$

14. 4

15. $a \neq 2$이면 $x = \dfrac{a-4}{a-2}$

16. $a \neq 0,\ a \neq 2$이면 $x = \dfrac{1-a}{a(a-2)}$

17. $-3,\ 2$

18. $2,\ 5$

19. $-\dfrac{1}{2},\ 2$

20. $-1,\ 2\sqrt{2}-2$

21. ± 2

22. $-1,\ 2$

23. -3

24. 9

25. $b = c$인 이등변삼각형

Section 2.1 확인문제

1. (a) $\sqrt{13}$ (b) $\sqrt{2}$ (c) $\sqrt{13}$ (d) $\sqrt{2}$

2. $(3,\ 2),\ (-3,\ -2),\ (-3,\ 2)$

3. $(-2,\ -2)$

Section 2.2 확인문제

1. (a) 함수가 아니다. (b) $\{1, 2, 4\}$
(c) 함수가 아니다. (d) $\{1\}$

2. (a) $\{1, 2, 3, 4, 5\}$ (b) 함수가 아니다. (c) $\{2, 3, 4\}$

3. $2 \leq k \leq 4$

4. $\{x | x \leq -1,\ 0 < x \leq 1\}$

Section 2.3 확인문제

1. $\{x|x \geq -1\},\ \{x|x \leq 1\}$

2. (a) $\mathbb{R}-\{2\},\ \{y|y>0\}$ (b) $\mathbb{R},\ \left\{y|y \geq -\frac{1}{4}\right\}$

3. $a=-3,\ b=2,\ c=1$

4. 1

5. (a) $\mathbb{R}$ (b) $\mathbb{R}$ (c) $\mathbb{R}$ (d) $\mathbb{R}-\{-1, 1\}$

6. (a) $\{x|x \geq 1\}$ (b) $\left\{x|x \geq \frac{1}{2}\right\}$ (c) $\{x|1<x<\sqrt{2}, x>\sqrt{2}\}$

7. (a) $\mathbb{R}$ (b) $\mathbb{R}$ (c) $\mathbb{R}-\{0\}$ (d) $\mathbb{R}-\{0\}$

8. $a=-2,\ b=-4$

9. $h(x)=\frac{1}{2}x-\frac{1}{2}$

Section 2.4 확인문제

1. (a) $-2,\ -1,\ 2$ (b) $-\frac{1}{2},\ 4,\ 2$

2. (a) $y=-x+5$ (b) $y=-2x-2$ (c) $y=-3x+5$

3. (a) $1,\ x=1,\ 2,\ y=2$ (b) $-4,\ x=\frac{1\pm\sqrt{3}}{2},\ y=2$

4. (a) $-x^2+2x+2$ (b) $2x^2-x+1$ (c) $5x^2-3x-2$

5. ± 4

6. (a) $3,\ -1$ (b) $8,\ -7$

7. (a) $\mathbb{R}-\{0\},\ \mathbb{R}-\{2\}$ (b) $\mathbb{R}-\{2\},\ \mathbb{R}-\{1\}$

(c) $-\frac{3\sqrt{2}}{2}\le x\le\frac{3\sqrt{2}}{2},\ y\ge 1$ (d) $x\le -1,\ x\ge\frac{1}{2},\ y\le 1$

8. (a) $y=x^2-2x+3$ (b) $x\le 1$ (c) $y\ge 2$

Chapter 02. 연습문제

1. (a) $0 \le x \le 2$ (b) $-4 \le x \le 2$

2. $f = h$

3. $\left\{\frac{1}{2}\right\}$

4. 7

5. (a) 4 (b) 16

6. (a) $2\sqrt{x-1}$ (b) $\sqrt{x-1}+\frac{1}{x^2}-1$ (c) $\frac{(1-x^2)\sqrt{x-1}}{x^2}$ (d) $\frac{x^2\sqrt{x-1}}{1-x^2}$

7. (a) 기함수 (b) 기함수 (c) 우함수 (d) 우함수

8. (a) $\sqrt{x^2-1}$ (b) x^2-1 (c) $x-1$

9. (a) 7 (b) -1 (c) $\frac{11}{3}$ (d) $\frac{11}{3}$

10. 3

11. $a=2,\ b=-\frac{1}{2}$

12. $a=2,\ b=-1,\ c=-2$

13. (a) $3,\ \dfrac{3}{2}$ (b) $\dfrac{9}{4}$

14. 1

15. $y=2(x+1)^2$

16. $(a,\ b)=(1,\ 1),\ (2,\ 7)$

17. $7,\ 7,\ 49$

18. $a=\dfrac{1}{2},\ b=\dfrac{9}{4}$

19. $f(-1)>f(0)>f(1)>f(2)$

20. (a) 전사함수 (b) 전단사함수 (c) 단사함수

Section 3.1 확인문제

1. (a) $\frac{8}{27}$ (b) $2\sqrt[5]{2^3}$ (c) 8 (d) 96

2. (a) 1 (b) $\frac{5}{2}$ (c) 3 (d) $2\log_3 5$

3. (a) $\frac{1}{5}$ (b) $\frac{1}{27}$

4. (a) 2 (b) -1

5. (a) 2 (b) $3+\ln 4$ (c) $\frac{16}{5}$ (d) $2\log_{10} 2$

6. (a) 2 (b) $\frac{13}{18}$ (c) $\frac{1}{4}(3-e^{-2})$ (d) e^e

7. -10

8. $1,\ 2$

Section 3.2 확인문제

1. (a) $\mathbb{R}$ (b) $\mathbb{R}$ (c) $\mathbb{R}$ (d) $\mathbb{R}-\{0\}$

2. $y=5^{1-x}+2$

3. $-\frac{1}{2}\log_2 5$

4. 14

5. $\alpha=2,\ \beta=3$

6. $\sinh x=\frac{\sqrt{5}}{2},\ \tanh x=\frac{\sqrt{5}}{3},\ \operatorname{cosech} x=\frac{2}{\sqrt{5}},\ \operatorname{sech} x=\frac{2}{3},\ \coth x=\frac{3}{\sqrt{5}}$

Section 3.3 확인문제

1. (a) $\mathbb{R}-\{0\}$ (b) $x<-1,\ x>3$

2. 8

3. $6,\ \dfrac{1}{16}$

4. (a) $y=\dfrac{1}{2}(1-\log_2 x)$ (b) $y=\dfrac{1}{2}(3^{x-2}+1)$

5. 1

6. (a) 1 (b) 1

7. 10

8. 2

9. 2

Chapter 03. 연습문제

1. 4

2. $\frac{3}{8}$

3. 4

4. $\frac{9}{2}$

5. $\frac{e^2-1}{2e}$

6. $e+\frac{1}{4e}$

7. $\frac{9-3\log_3 7}{2}$

8. 1

9. 1

10. 3

11. $\frac{13}{6}$

12. $\frac{1}{2}$

13. -3

14. $2\sinh x \cosh y$

15. $0,\ 1$

16. $3^{2-2\sqrt{2}},\ 3^{2+2\sqrt{2}}$

17. 3^{x-1}

18. 10

19. $1+2\log_2 x,\ 2$

Section 4.1 확인문제

1. (a) $\frac{1}{18}\pi$ (b) $\frac{11}{18}\pi$ (c) $\frac{25}{18}\pi$ (d) $\frac{16}{9}\pi$

2. $\sin A = \frac{12}{13}$, $\cos A = \frac{5}{13}$

3. 밑변 $4\sqrt{2}$, 높이 $4\sqrt{2}$

4. $l = \frac{2\pi}{3}$, $S = \frac{4\pi}{3}$

5. $\frac{2\pi}{3}$

6. 제2사분면

7. $\sin\theta = -\frac{3}{5}$, $\tan\theta = -\frac{3}{4}$, $\sec\theta = \frac{5}{4}$, $\operatorname{cosec}\theta = -\frac{5}{3}$, $\cot\theta = -\frac{4}{3}$

8. (a) $\frac{1}{2}$ (b) 0 (c) 1 (d) 2

9. (a) $\sin\theta - \cos\theta$ (b) 0

10. $\frac{400}{3}\sqrt{3}$ (m)

Section 4.2 확인문제

1. $\sin\theta = -\dfrac{\sqrt{3}}{2}$, $\tan\theta = \dfrac{\sin\theta}{\cos\theta} = \sqrt{3}$

2. $-\dfrac{\sqrt{2}}{4}$

3. (a) $\cos\theta + \sin\theta$ (b) $2\sec\theta$

4. (a) $-\dfrac{\sqrt{2}}{2}$ (b) $-\dfrac{1}{2}$ (c) -1

5. $2\sec\theta$

6. (a) $-\dfrac{\sqrt{3}}{2}$ (b) $\dfrac{\sqrt{3}}{2}$

7. (a) $\dfrac{\sqrt{3}}{2}, -\dfrac{1}{2}, -\sqrt{3}$ (b) $\dfrac{2\pi}{3}$

8. (a) $\dfrac{\sqrt{6}+\sqrt{2}}{4}$ (b) $\dfrac{\sqrt{6}+\sqrt{2}}{4}$ (c) $2-\sqrt{3}$

9. $\dfrac{4\sqrt{5}}{9}, \dfrac{1}{9}$

10. $-\dfrac{\sqrt{3-2\sqrt{2}}}{6}, \dfrac{\sqrt{3+2\sqrt{2}}}{6}$

11. (a) $\dfrac{1}{2}(\sin 4\theta - \sin 2\theta)$ (b) $-\dfrac{1}{2}(\cos 5\theta - \cos 3\theta)$

12. (a) $-2\sin 4\theta \sin\theta$ (b) $-2\cos 3\theta \sin\theta$

13. $\dfrac{3}{5}, -\dfrac{4}{5}, -\dfrac{\sqrt{2}}{10}$

14. (a) 0.3419 (b) 0.9662 (c) -0.0875

15. (a) $2\sin\left(\theta-\dfrac{\pi}{4}\right), 2\cos\left(\theta-\dfrac{3\pi}{4}\right)$

(b) $5\sin(\theta+\alpha), \tan\alpha=\dfrac{4}{3}, 5\cos(\theta-\beta), \tan\beta=\dfrac{3}{4}$

Section 4.3 확인문제

1. $\dfrac{1-\sqrt{3}}{2}$

2. (a) $\pi,\ 2,\ 2,\ -2$ (b) $12,\ \dfrac{1}{2},\ \dfrac{1}{2},\ -\dfrac{1}{2}$

(c) $p=2,\ \sqrt{2},\ \sqrt{2},\ -\sqrt{2}$ (d) $4\pi^2,\ 1,\ 1,\ -1$

3. $2,\ -2$

4. (a) $y=\dfrac{\sqrt{3}}{3}x+1$ (b) $y=\sqrt{3}\,x+\sqrt{3}-1$

5. $-\dfrac{\pi}{3}$

6. $5,\ \dfrac{1}{2}$

7. $\dfrac{\pi}{4}$

8. $a=3,\ b=3,\ c=1$

Section 4.4 확인문제

1. (a) $-\frac{\pi}{4}$ (b) $\alpha = \frac{\pi}{4}$ (c) $-\frac{\pi}{3}$ (d) 존재하지 않는다.

2. (a) $\frac{1}{2\sqrt{2}}$ (b) $\frac{3}{4}$

3. (a) 0 (b) $\frac{4}{\sqrt{17}}$

4. $\sqrt{1+x^2}$

5. $\frac{\pi}{6}$

6. $\frac{\pi}{3}, \pi$

Chapter 04. 연습문제

1. $r=8,\ l=2\pi$

2. $S=9,\ r=3,\ \theta=2(\text{rad})$

3. $\cos\theta=\frac{15}{17},\ \tan\theta=\frac{8}{15},\ \sec\theta=\frac{17}{15},\ \operatorname{cosec}\theta=\frac{17}{8},\ \cot\theta=\frac{15}{8}$

4. $\sin\theta=-\frac{2\sqrt{6}}{7},\ \cos\theta=-\frac{5}{7},\ \tan\theta=\frac{2\sqrt{6}}{5}$

5. $-\frac{25}{34}$

6. $50(1+\sqrt{3}\ )$

7. $\frac{8}{5}\pi$

8. $\frac{7\sqrt{13}}{39}$

9. $\frac{\sqrt{5}}{3}$

10. $-\sin\theta+\cos\theta$

11. (a) $-\frac{1}{8}$ (b) $\frac{9\sqrt{3}}{16}$

12. $-\frac{1}{2}$

13. $\frac{\sqrt{2}}{2}$

14. 1

15. 1

16. 0

17. $\frac{3\sqrt{3}-\sqrt{7}}{8}$, $-\frac{3+\sqrt{21}}{8}$, $\frac{4\sqrt{3}-3\sqrt{7}}{3}$

18. $\sqrt{\frac{4+\sqrt{6}-\sqrt{2}}{8}}$, $\sqrt{\frac{4-\sqrt{6}+\sqrt{2}}{8}}$

19. 0

20. $\sqrt{13}$, $-\sqrt{13}$

21. $-\frac{3}{10}$

22. $\frac{1}{2}$

23. $-\frac{\pi}{6}$

24. 0

25. $\frac{\sqrt{3}}{2}$

26. $\frac{\pi}{2}$

27. $\frac{3\pi}{4}$

28. 생략

Section 5.1 확인문제

1. (a) -3 (b) -2 (c) 존재하지 않는다.
(d) 3 (e) 1 (f) 존재하지 않는다.

2. (a) -6 (b) 존재하지 않는다.

3. (a) 존재하지 않는다. (b) 1 (c) $\frac{1}{3}$ (d) 0

4. 0

5. (a) 1 (b) 1 (c) $-\infty$ (d) ∞

Section 5.2 확인문제

1. (a) 1 (b) 8 (c) -2 (d) $-\frac{1}{2}$

2. $\lim_{x \to 2} g(x) = 4 = g(2)$

3. (a) 2 (b) 존재하지 않는다.

4. (a) $\frac{1}{2}$ (b) 0

5. (a) 0 (b) 0

6. 2

7. 생략

Section 5.3 확인문제

1. (a) $\frac{1}{2}$ (b) 0

2. (a) $\frac{1}{2}$ (b) $\sqrt{2}$

3. 0

4. $\frac{\pi}{180}$

Section 5.4 확인문제

1. (a) 1 (b) $\frac{1}{2}$ (c) $\ln 2$

(d) 1 (e) 0 (f) $-\infty$

2. (a) 0 (b) $\frac{1}{\sqrt{e}}$ (c) 1

(d) 3 (e) $-\frac{3}{2}$ (f) $\frac{1}{2}$

Section 5.5 확인문제

1. (a) 1 (b) 1

2. (a) $\{x|\ x \leq -3,\ x \geq 3\}$ (b) $\{x|\ x \neq 2$인 모든 실수$\}$

3. 4

4. $\sqrt{3}$

5. $-4,\ -3$

6. 1

Chapter 05. 연습문제

1. -1

2. $\frac{1}{2}$

3. 1

4. $-\frac{1}{2}$

5. 존재하지 않는다.

6. 0

7. $-\infty$

8. 0

9. $\frac{2}{3}$

10. 0

11. 3

12. 0

13. 1

14. ∞

15. $-\frac{1}{2}$

16. $-\frac{1}{2}$

17. $a=-2,\ b=\pi$

18. 1

19. 1

20. (a) 생략 (b) $1, 0$ (c) 정수가 아닌 모든 실수

21. 3

22. 27

23. 2

24. $-1, 1$

25. 생략

Section 6.1 확인문제

1. 미분 가능하지 않다.

2. $\frac{3}{2}$

3. $y = -x + 1$

4. $2x - 1$

5. -5

6. (a) 9 (b) -2

7. $-\frac{2}{3}$

Section 6.2 확인문제

1. (a) $4x(x-1)(x+1)$ (b) $18x^2+18x-2$

(c) $\dfrac{x^2-2x-2}{(x-1)^2}$ (d) $\dfrac{2(x^2-3x+1)}{(x^2-1)^2}$

2. (a) $8(2x-3)^3$ (b) $\dfrac{2}{\sqrt[3]{3x-1}}$

3. (a) $y=\sqrt[3]{x-1}$ (b) $\dfrac{1}{3\sqrt[3]{(x-1)^2}}$ (c) $\dfrac{1}{3\sqrt[3]{(x-1)^2}}$

4. (a) $\dfrac{1}{5x^4-6x^2+1}$ (b) $\dfrac{(x^2+1)^2}{1-x^2}$

5. (a) $\dfrac{4x-y^2}{2xy}$ (b) $-\dfrac{y^2+2xy}{x^2+2xy}$ (c) $\dfrac{y-2x}{2y-x}$ (d) $\dfrac{2y-x}{y-2x}$

6. $y=\dfrac{2\sqrt{3}}{3}x-\dfrac{\sqrt{3}}{3}$

7. (a) $\dfrac{2(t+1)}{2}=t+1$ (b) $\dfrac{t^2-1}{t^2+1}$

(c) $\dfrac{(1+t^2)^3}{2t^3}$ (d) $\dfrac{2(1+2t^2)\sqrt{t-1}}{\sqrt{1+t^2}}$

8. $y^{(n)}=(-1)^n(n!)x^{-n-1}$ **9.** $y=x$ **10.** 생략 **11.** 생략

Section 6.3 확인문제

1. (a) $\cos x - 3\sin x$ (b) $-2x\sin(2x^2)$

(c) $\sec x(\tan^2 x + \sec^2 x)$ (d) $\sin(x^2-1) + 2x^2\cos(x^2-1)$

2. (a) $\ln 2$ (b) $-4\ln 2$ (c) $1+\ln 3$ (d) 2

3. (a) $(\ln 2)2^x + 2e^{2x}$ (b) $(x^2+3x+2)e^x$

(c) $\cos x((\ln 3)3^{\sin x} + 3\sin^2 x)$ (d) $(\cos x - 2x\sin x\sin(x^2))e^{\cos x^2}$

4. (a) $1+\frac{1}{x}$ (b) $\frac{1}{\ln x} + \ln(\ln x)$ (c) $\frac{1}{x(\ln 2)\ln x}$ (d) $\frac{\cos x - \sin x}{\cos x + \sin x}$

5. (a) $2\cosh(2x+1)$ (b) $\frac{2\sinh(\sin^{-1}(2x+1))}{\sqrt{1-(2x+1)^2}}$

(c) $-\frac{x+1}{x\sqrt{1-(x+\ln x)^2}}$ (d) $\frac{\sin x + \cos x}{\sqrt{\sin 2x}}$

6. $y = -\frac{4+\pi}{20}x + \frac{16+9\pi}{20}$

7. $y^{(n)} = \sin\left(x + \frac{n\pi}{2}\right)$

8. (a) $y' = \frac{x^{\sin x}(x\cos x\ln x + \sin x)}{x}$ (b) $y' = e^x(\sin x + \cos x)$

Section 6.4 확인문제

1. 0

2. $\dfrac{3-2\sqrt{3}}{3}$

3. (a) 3.037 (b) 0.495 (c) 0.04 (d) 1.2

4. (a) 1 (b) 1 (c) 1 (d) 1

5. 생략

Section 6.5 확인문제

1. (a) 감소 : $x<-1,\ 0<x<1$, 증가 : $-1<x<0,\ x>1$

(b) 감소 : $0<x<\frac{\pi}{3},\ \frac{5\pi}{3}<x<2\pi$, 증가 : $\frac{\pi}{3}<x<\frac{5\pi}{3}$

(c) 감소 : $0<x<1$, 증가 : $x>1$

(d) 감소 : $x<0,\ 0<x<2$, 증가 : $x>2$

2. $a>0$일 때, 감소 : $x<-\frac{b}{2a}$, 증가 : $x>-\frac{b}{2a}$,

$a<0$일 때, 감소 : $x>-\frac{b}{2a}$, 증가 : $x<-\frac{b}{2a}$

3. (a) 극댓값 : $\frac{3}{4}(-3+2\sqrt{3}\,)$, 극솟값 : $0,\ -\frac{3}{4}(3+2\sqrt{3}\,)$

(b) 극댓값 : $\sqrt{2}$, 극솟값 : $-\sqrt{2}$

(c) 극댓값 : 2, 극솟값 : -2

(d) 극솟값 : $-e^{-1}$

4. (a) 극댓값(최댓값) : 4, 극솟값(최솟값) : 0

(b) 극댓값 : 2, 극솟값 : 6, 최솟값과 최댓값은 존재안함.

(c) 극솟값(최솟값) : $-e^{-1}$, 최댓값 : $2\ln 2$

(d) 극댓값(최댓값) : $\frac{512}{25\sqrt{5}}$, 극솟값(최솟값) : 0

(e) 극솟값(최솟값) : $-e^{-1}$, 최댓값 : e

(f) 극댓값(최댓값) : $\sqrt{2}$, 극솟값(최솟값) : $-\sqrt{2}$

5. (a) 아래로 볼록 : $x<-\sqrt{\frac{2}{5}}$, $x>\sqrt{\frac{2}{5}}$,

위로 볼록 : $-\sqrt{\frac{2}{5}}<x<\sqrt{\frac{2}{5}}$

(b) 아래로 볼록 : $x>0$, 위로 볼록: $x<0$

(c) 아래로 볼록 : $x>0$

(d) 아래로 볼록 : $x<-2-\sqrt{2}$, $x>-2+\sqrt{2}$,

위로 볼록 : $-2-\sqrt{2}<x<-2+\sqrt{2}$

6. 극댓값 $\frac{e^{-\pi/4}}{\sqrt{2}}$, 극솟값 $-\frac{e^{-5\pi/4}}{\sqrt{2}}$

7. 생략

8. 128㎤

9. (a) $4\,\text{cm/s}$ (b) $\frac{5}{12}\,\text{cm}$

Chapter 06. 연습문제

1. $8x+12$

2. $\dfrac{1}{(2x+1)^2}$

3. 0

4. 존재하지 않는다.

5. (a) 1 (b) $\dfrac{5}{2}$

6. $-\dfrac{x^2+4x+1}{(x^2-1)^2}$

7. $\dfrac{2\sqrt{x}+1}{4\sqrt{x^2+x\sqrt{x}}}$

8. 0

9. $(1+2\cos 2x)\sec^2(x+\sin 2x)$

10. $y-y_0=-\dfrac{b^2x_0}{a^2y_0}(x-x_0)$

11. $\dfrac{4}{5}$

12. $-\frac{49}{37}$

13. 1

14. $\ln 4$

15. e^{-1}

16. 0

17. 생략

18. 생략

19. $5400\pi\text{㎠}$

20. 5㎝

21. $3750(\text{m})$

22. $1000(\text{km})$

Section 7.1 확인문제

1. (a) $x+x^2+C$ (b) $x-x^2+\sin x+C$

(c) $\dfrac{x^2-1}{x}$ (d) $\tan x+\ln(2x+1)$

2. (a) $\dfrac{1}{2}x^2+2x+C$ (b) $\dfrac{2}{3}x^3+\dfrac{3}{2}x^2-x+C$

(c) $x^2-x+\ln|x|+C$ (d) $x-2\tan^{-1}x+C$

(e) $x-4\sqrt{x}+\ln|x|+C$ (f) $2\sin^{-1}x+C$

(g) $x-\cos x-2\sin x+C$ (h) $\tan x+\cot x+C$

(i) $\dfrac{2^x}{\ln 2}+3e^x+C$ (j) $\dfrac{1}{3}e^{3x}-\cos x+C$

(k) $\cosh x+2\sinh x+C$ (l) $2\tanh x-3\coth x+C$

3. $x+\dfrac{2}{3}x^{3/2}-2$

4. (a) $x-\cos x-2$ (b) $x^2+1-3\ln|x|$

5. $2\ln|x|+1$

6. (a) -4 (b) $\dfrac{22}{3}$

7. (a) $a=-2,\ \dfrac{1}{3}x^3-x^2-x+\dfrac{10}{3}$

(b) $a=-1,\ \dfrac{1}{3}x^3-\dfrac{1}{2}x^2-x+\dfrac{1}{6}$

Section 7.2 확인문제

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

(b) $\frac{1}{4}(x^3+3)^4+C$

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

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

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

(f) $\frac{1}{2}\sin^{-1}(2x)+C$

(g) $\ln|\ln x|+C$

(h) $\frac{1}{3}(\ln x)^3+C$

(i) $\ln|\sin x|+C$

(j) $-\ln|\operatorname{cosec}x+\cot x|+C$

(k) $x+\sin^2 x+C$

(l) $\frac{1}{3}\sin^3 x+C$

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

(b) $(x^2-x+2)e^x+C$

(c) $x\sin x+\cos x+C$

(d) $-(x^2-2)\cos x+2x\sin x+C$

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

(f) $\frac{1}{9}x^3(-1+3\ln x)+C$

(g) $\frac{1}{2}e^x(\sin x+\cos x)+C$

(h) $-\frac{1}{2}e^{-x}(\cos x+\sin x)+C$

(i) $x\sin^{-1}x+\sqrt{1-x^2}+C$

(j) $x\cos^{-1}x-\sqrt{1-x^2}+C$

(k) $\frac{1}{2}x^2\tan^{-1}x-\frac{1}{2}(x-\tan^{-1}x)+C$

(l) $\frac{1}{3}x^3\tan^{-1}x-\frac{1}{6}(x^2-\ln(1+x^2))+C$

3. (a) $\frac{e^{ax}}{a^2+b^2}(a\sin bx-b\cos bx)+C$

(b) $\frac{e^{-2x}}{13}(-2\sin 3x-3\cos 3x)+C$

Section 7.3 확인문제

1. (a) $\frac{2}{3}$ (b) $2\ln 2$ (c) $\frac{2}{3}$ (d) 1

(e) $\frac{\ln 2}{1+\ln 2}$ (f) $-1+2\ln 2$ (g) 1

(h) $\frac{1}{2}(e^{\pi/2}+1)$ (i) $\frac{\pi}{2}-1$ (j) $\frac{\pi-2}{4}$

2. $\frac{1}{4}$

3. (a) 2 (b) $\frac{2\sqrt{3}}{3}$

4. $\frac{7}{2}$

5. 6

6. $\frac{3}{2}$

7. (a) $3x^2-2x$ (b) 100

8. $4x^3-3x^2+1,\ a=1$

9. (a) x^2+1 (b) $\frac{\sqrt{1+\sqrt{x}}}{2\sqrt{x}}-\sqrt{x+1}$

Section 7.4 확인문제

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

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

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

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

(e) $\ln\left|\frac{x+1}{x+2}\right|+C$

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

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

(h) $\frac{1}{x+1}+\ln\left|\frac{x}{x+1}\right|+C$

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

(j) $\frac{2}{x}+\frac{3}{2}\ln\left|\frac{x-2}{x}\right|+C$

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

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

2. (a) $\frac{1}{2}\tan^{-1}\frac{x}{2}+C$

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

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

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

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

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

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

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

3. (a) $\dfrac{\ln 5}{3}$ (b) $\dfrac{1}{2}\ln\dfrac{3}{2}$

(c) $\dfrac{1}{2}(15\ln 2-9\ln 3)$ (d) $\dfrac{1}{3}\tan^{-1}\dfrac{2}{3}$

(e) 0 (f) $\dfrac{1}{8}(-\pi+6\ln 2)$

4. $1+\ln\left|\dfrac{x-2}{2(x-1)}\right|$

Section 7.5 확인문제

1. (a) $\frac{1}{4}(2x-\sin 2x)+C$ (b) $\frac{x}{2}+\frac{1}{4}\sin 2x+C$

(c) $\frac{1}{32}(12x-8\sin 2x+\sin 4x)+C$ (d) $\sin x-\frac{1}{3}\sin^3 x+C$

(e) $-\frac{1}{5}\cos^5 x+\frac{2}{3}\cos^3 x+\cos x+C$ (f) $\frac{1}{32}(12x+8\sin 2x+\sin 4x)+C$

2. (a) $\frac{1}{5}\cos^5 x-\frac{1}{3}\cos^3 x+C$ (b) $\frac{1}{7}\sin^7 x-\frac{2}{5}\sin^5 x+\frac{1}{3}\sin^3 x+C$

(c) $\frac{1}{4}\sin^4 x-\frac{1}{6}\sin^6 x+C$ (d) $-\sin x+2\tan^{-1}(\sin x)+C$

(e) $\frac{1}{16}\left(x-\frac{\sin 4x}{4}+\frac{\sin^3 2x}{3}\right)+C$ (f) $\frac{1}{32}(4x-\sin 4x)+C$

(g) $2\sqrt{\sin x}-\frac{4}{5}\sin^2 x\sqrt{\sin x}+\frac{2}{9}\sin^4 x\sqrt{\sin x}+C$

(h) $\frac{2}{13}\cos^{13/2} x-\frac{2}{3}\cos^{9/2} x+\frac{6}{5}\cos^{5/2} x-2\cos^{1/2} x+C$

3. (a) $\frac{1}{4}\tan^4 x-\frac{1}{2}\tan^2 x-\ln|\cos x|+C$

(b) $-x+\frac{1}{5}\tan^5 x-\frac{1}{3}\tan^3 x+\tan x+C$

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

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

(e) $\frac{1}{6}\tan^6 x + \frac{1}{4}\tan^4 x + C$

(f) $\frac{1}{5}\sec^5 x - \frac{1}{3}\sec^3 x + C$

(g) $-\frac{1}{7}\operatorname{cosec}^7 x + \frac{1}{5}\operatorname{cosec}^5 x + C$

(h) $-\frac{1}{5}\cot^5 x - \frac{1}{3}\cot^3 x + C$

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

(j) $-\tan x + \ln\left|\frac{1+\tan x}{-1+\tan x}\right| + C$

4. (a) $-\frac{1}{6}(\cos 3x + 3\cos x) + C$

(b) $\frac{1}{14}(-\cos 7x + 7\cos x) + C$

(c) $\frac{1}{4}\left(-\frac{1}{10}\cos 10x + \frac{1}{6}\cos 6x - \frac{1}{4}\cos 4x\right) + C$

(d) $\frac{1}{4}\left(x + \frac{1}{6}\sin 6x + \frac{1}{4}\sin 4x + \frac{1}{2}\sin 2x\right) + C$

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

(b) $\frac{\sqrt{2}}{4}$

(c) 0

(d) $\frac{2}{35}$

(e) $\frac{4}{3}$

(f) $\frac{\pi}{4} - \frac{2}{3}$

(g) $\frac{2}{105}(-4 + 11\sqrt{2})$

(h) $2 - 2\ln 2$

Section 7.6 확인문제

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

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

(c) $\frac{1}{2}\ln\left|\frac{-2+\sqrt{4-x}}{2+\sqrt{4-x}}\right|+C$

(d) $-\frac{2}{5}\sqrt[4]{(1-2x)^5}+C$

(e) $-\frac{2}{3}(6+x))\sqrt{3-x}+C$

(f) $2\tan^{-1}\sqrt{x}+C$

(g) $\frac{3}{5}\sqrt[3]{(1-x)^5}-\frac{3}{2}\sqrt[3]{(1-x)^2}+C$

(h) $-\frac{2}{3}(x+5)\sqrt{1-x}+C$

(i) $\frac{3}{5}\sqrt[3]{x^5}-\frac{3}{4}\sqrt[3]{x^4}+x-\frac{3}{2}\sqrt[3]{x^2}+3\sqrt[3]{x}-3\ln|1+\sqrt[3]{x}|+C$

(j) $\frac{2}{3}\sqrt{x^3}+x+4\sqrt{x}+4\ln|-1+\sqrt{x}|+C$

2. (a) $\sin^{-1}\frac{x}{2}+C$

(b) $\ln\left|x+\sqrt{x^2-4}\right|+C$

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

(d) $\ln|x-2+\sqrt{x^2-4x+5}|+C$

(e) $-\frac{1}{2}\ln\left|\frac{2+\sqrt{4-x^2}}{x}\right|+C$

(f) $-\frac{\sqrt{4-x^2}}{4x}+C$

(g) $\sqrt{x^2-1}+\tan^{-1}\sqrt{x^2-1}+C$

(h) $\frac{\sqrt{x^2+9}}{3}(x^2+9)+C$

3. (a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}-\frac{\sqrt{3}}{2}$ (c) $\frac{4-\sqrt{10}}{3}$

(d) $\frac{\pi}{6}$ (e) $\frac{1}{12}(4\pi-3\sqrt{3}\ )$ (f) $\frac{2\sqrt{2}-\sqrt{5}}{2}$

4. $\frac{1}{4}\left[(2x^2-1)\sin^{-1}x+x\sqrt{1-x^2}\ \right]+C$

Section 7.7 확인문제

1. (a) 2 (b) $2\ln 2$ (c) $\frac{9}{2}$ (d) $-2+3\ln 3$

2. (a) $\frac{9}{2}$ (b) $\frac{343}{6}$ (c) $\frac{1}{6}$ (d) $\frac{1}{2}$

3. (a) $\frac{1}{12}$ (b) $\frac{96}{5}$ (c) $\frac{8}{3}$ (d) $\pi-\frac{2}{3}$

4. (a) $\frac{32\pi}{5}$ (b) $\frac{7\pi}{24}$ (c) $\frac{\pi}{30}$ (d) $\frac{\pi^2}{16}$

5. (a) $\frac{31\pi}{5}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{2}(e^4-4e^2+7)$ (d) $\frac{3\pi}{2}$

6. $\frac{32\pi}{5}$

7. $\frac{a^2h}{3}\pi$

8. (a) $\frac{\sqrt{2}+\ln(1+\sqrt{2})}{2}$ (b) $\sqrt{2}+\ln(1+\sqrt{2})$

9. $8\sqrt{5}\,\pi$

Chapter 07. 연습문제

1. $\frac{1}{3}x^3 - 2x + \ln|x| + C$

2. $\frac{x^4}{4} + \frac{3x^2}{2} - \frac{1}{2x^2} + 3\ln|x| + C$

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

4. $\sqrt{2x - x^2} + C$

5. $\frac{2}{3}\sqrt{x^3 + 3x + 4} + C$

6. $\cos x\,(-1 + \ln|\cos x|) + C$

7. $x\left[(\ln x)^2 - 2\ln x + 2\right] + C$

8. $-(x^2 + 2x + 2)\,e^{-x} + C$

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

10. $\frac{1}{2}x\sin 2x + \frac{1}{4}\cos 2x + C$

11. $\frac{x^2}{4}\left[1+2(\ln x)^2-2\ln x\right]+C$

12. $\frac{1}{4}x^4\left(-1+2\ln x^2\right)+C$

13. $x+\frac{1}{2}\ln|1-x^2|+C$

14. $\frac{3}{4}\ln\left|\frac{x-1}{x+1}\right|-\frac{1}{2}\tan^{-1}x+C$

15. $-\frac{2}{45}\sqrt{\cos x}\left(45-18\cos^2 x+5\cos^4 x\right)+C$

16. $\frac{\operatorname{cosec} 2x}{6}\left(3-\operatorname{cosec}^2 2x\right)+C$

17. $-\frac{1}{10}(\cos 5x+5\cos x)+C$

18. $\frac{1}{10}(5\cos x-\cos 5x)+C$

19. $-\frac{2}{3}(x+4)\sqrt{2-x}+C$

20. $-\frac{1}{2}\left[\frac{\sqrt{1+x^2}}{x^2}+\ln\left(\frac{1+\sqrt{1+x^2}}{x}\right)\right]+C$

21. $1-\frac{\pi}{2}$

22. $\frac{1}{2}\ln 2$

23. $3(e-1)+\frac{1}{\ln 2}$

24. $\frac{4}{3}$

25. $\frac{1}{2}$

26. $\frac{1+e^2}{4}$

27. $\frac{3}{5}(e^{\pi}-1)$

28. $\frac{1}{2}\ln\frac{8}{5}$

29. $\frac{\pi}{2}$

30. $\frac{1}{4}(\pi-2\ln 2)$

31. $8x^3 - 9x^2 + 1$

32. $\ln \dfrac{e^4 - 1}{4}$

33. $\sin x - \cos x + 2$

34. $(x^2 - 1)(x^2 - 2)$

35. $2x^7 - \dfrac{14}{3}x^6 + 7x^5 - 10x^4 + \dfrac{7}{3}x^3 + 14x^2$

36. $-x^2 + 1$

37. $\dfrac{\sqrt{1+\sqrt{x}}}{2\sqrt{x}} - \sqrt{x+1}$

38. $\dfrac{37}{3}$

39. $\dfrac{\pi}{4}$

40. $2\sqrt{3}$

41. $\dfrac{27}{4}$

42. $\frac{e}{2}-1$

43. $\sqrt[3]{4}$

44. $\frac{117}{5}\pi$

45. $\frac{\pi}{6}$

46. $\frac{\pi}{2}$

47. 2π

48. $\frac{39}{2}\pi$

49. $2\pi a$

50. $\frac{\pi}{30}$