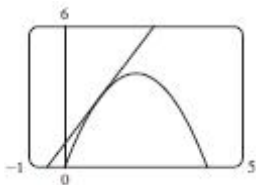


부록 E 해답

2장

연습문제 2.1

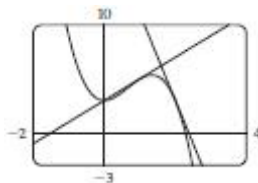
01. (a) 2 (b) $y = 2x + 1$ (c)



02. $y = -8x + 12$

03. $y = \frac{1}{2}x + \frac{1}{2}$

04. (a) $8a - 6a^2$ (b) $y = 2x + 3$, $y = -8x + 19$ (c)



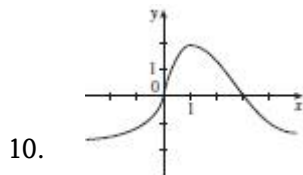
05. (a) 0 (b) C (c) 속도를 올린다. 속도를 낮춘다. 어느 것도 아니다.
(d) 자동차가 정지해있다.

06. -9.6 m/s

07. $-\frac{2}{a^3} \text{ m/s}$; -2 m/s ; $-\frac{1}{4} \text{ m/s}$; $-\frac{2}{27} \text{ m/s}$

08. $g'(0)$, 0 , $g'(4)$, $g'(2)$, $g'(-2)$

09. $f(2) = 3$; $f'(2) = 4$

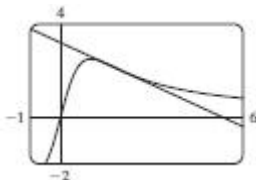


10.

11. $y = 3x - 1$

12. (a) $-\frac{3}{5}$; $y = -\frac{3}{5}x + \frac{16}{5}$

(b)



13. $6a - 4$

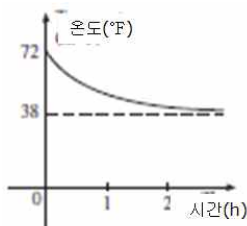
14. $\frac{5}{(a+3)^2}$

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

16. $f(x) = x^{10}$, $a = 1$ 또는 $f(x) = (1+x)^{10}$, $a = 0$

17. $f(x) = 2^x$, $a = 5$

18. $f(x) = \cos x$, $a = \pi$ 또는 $f(x) = \cos(\pi + x)$, $a = 0$



19. ; 더 크다.

20. (a) (i) 0.82 (ii) 1.07 (iii) 1.38 (b) 연간 1.23백만 승객

21. (a) (i) 20.25달러/단위 (ii) 20.05달러/단위 (b) 20달러/단위

22. (a) 생산한 금괴의 kg당 달러의 변화율

(b) 50 kg의 금이 생산되었을 때, 생산비용이 36달러/kg이다.

(c) 단기간에 감소하고 장기간에 증가한다.

23. 오후 5시에 온도의 변화율; $-1.25^{\circ}\text{C}/\text{h}$

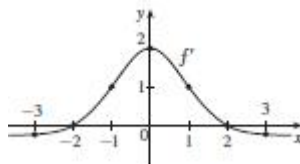
24. (a) 물의 온도에 관한 산소의 용해율; $(\text{mg/L})/^{\circ}\text{C}$

(b) $S'(16) \approx -0.25$; 온도가 16°C 로 증가할 때 산소의 용해율은 $0.25(\text{mg/L})/^{\circ}\text{C}$ 의 비율로 감소한다.

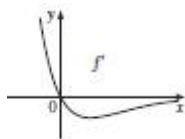
25. 존재하지 않는다.

연습문제 2.2

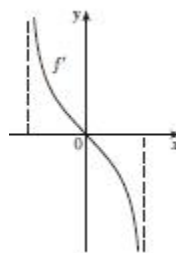
01. (a) -0.2 (b) 0 (c) 1 (d) 2 (e) 1 (f) 0 (g) -0.2



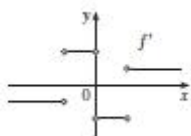
02. (a) II (b) IV (c) I (d) III



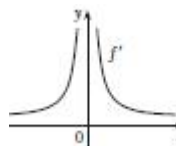
03.



04.

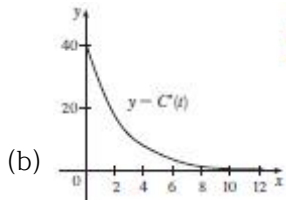


05.

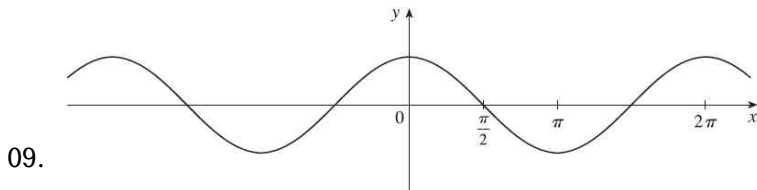
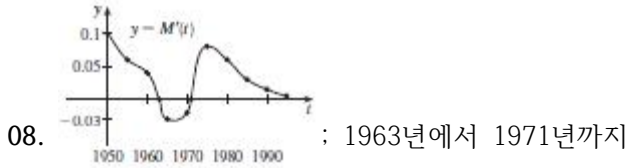


06.

07. (a) 경과시간(h)에 관한 총용량의 백분율에 대한 순간변화율

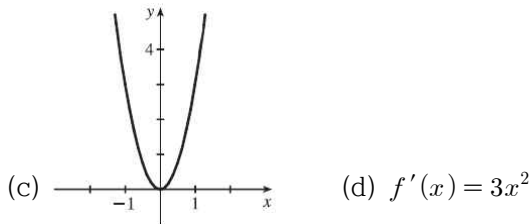


총용량의 백분율에 대한 변화율이 감소하여 0으로 접근한다.



10. (a) 0, 1, 2, 4 (b) -1, -2, -4 (c) $f'(x) = 2x$

11. (a) 0, 0.75, 3, 12, 27 (b) 0.75, 3, 12, 27



12. $f'(x) = \frac{1}{2}$, \mathbb{R} , \mathbb{R} 13. $f'(x) = 3x^2 - 3$, \mathbb{R} , \mathbb{R}

14. $g'(x) = -\frac{1}{2\sqrt{9-x}}$, $(-\infty, 9]$, $(-\infty, 9)$

15. $G'(t) = 4/(t+1)^2$, $(-\infty, -1) \cup (-1, \infty)$, $(-\infty, -1) \cup (-1, \infty)$

16. $f'(x) = 4x^3$, \mathbb{R} , \mathbb{R} 17. $f'(x) = 4x^3 + 2$

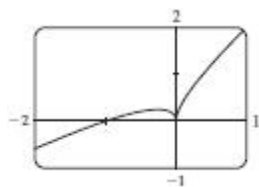
18. (a) 실업률의 변화율, 연간 실직한 비율

(b)

t	$U'(t)$	t	$U'(t)$
1995	-0.10	2000	0.10
1996	0.05	2001	0.15
1997	-0.05	2002	-0.35
1998	-0.75	2003	-0.45
1999	-0.85	2004	-0.60

19. -4(뽕족한 점); 0(불연속 점)

20. -1(수직접선); 4(뽕족한 점)

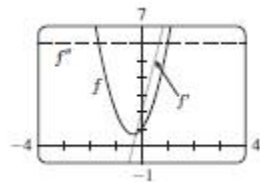


21. ; -1에서 미분 가능; 0에서 미분 불가능

22. $a = f, b = f', c = f''$

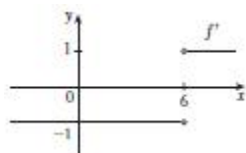
23. $a = \text{가속도}, b = \text{속도}, c = \text{위치}$

24. $6x + 2; 6$



25. (a) $\frac{1}{3}a^{-2/3}$ (b) 생략

26. $f'(x) = \begin{cases} -1, & x < 6 \\ 1, & x > 6 \end{cases}$ 또는 $f'(x) = \frac{x-6}{|x-6|}$



27. 생략

28. 63°C

연습문제 2.3

01. $f'(x) = 0$

02. $f'(t) = -\frac{2}{3}$

03. $f'(x) = 3x^2 - 4$

04. $f'(x) = 6x + 2 \sin x$

05. $g'(x) = 2x - 6x^2$

06. $y' = -\frac{2}{5}x^{-7/5}$

07. $A'(s) = 60/s^6$

08. $R'(a) = 18a + 6$

09. $S'(p) = \frac{1}{2}p^{-1/2} - 1$

10. $S'(R) = 8\pi R$

11. $y' = \frac{3}{2}\sqrt{x} + \frac{2}{\sqrt{x}} - \frac{3}{2x\sqrt{x}}$

12. $v' = 2t + \frac{3}{4t^4\sqrt{t^3}}$

13. $z' = -10A/y^{11} - B \sin y$

14. $H'(x) = 3x^2 + 3 - 3x^{-2} - 3x^{-4}$

15. $y = -3\sqrt{3}x + 3 + \pi\sqrt{3}, y = \frac{x}{3\sqrt{3}} + 3 - \frac{\pi}{9\sqrt{3}}$

16. $y = 3x - 1$

17. $f'(x) = 4x^3 - 9x^2 + 16, f''(x) = 12x^2 - 18x$

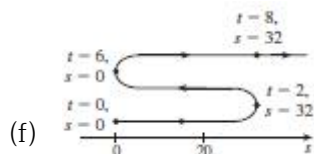
18. $g'(t) = -2 \sin t - 3 \cos t, g''(t) = -2 \cos t + 3 \sin t$

19. $-\cos x$ 20. $(2n+1)\pi \pm \frac{\pi}{3}$, n 은 정수 21. 생략

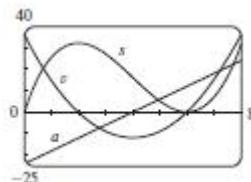
22. $y = \frac{1}{3}x - \frac{1}{3}$

23. (a) $v(t) = 3t^2 - 3$, $a(t) = 6t$ (b) 12 m/s^2 (c) $a(1) = 6 \text{ m/s}^2$

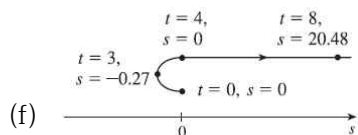
24. (a) $3t^2 - 24t + 36$ (b) -9 m/s (c) $t = 2, 6$ (d) $0 \leq t < 2, t > 6$ (e) 96 m



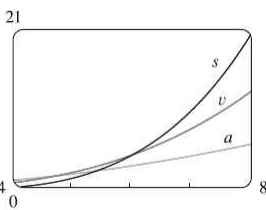
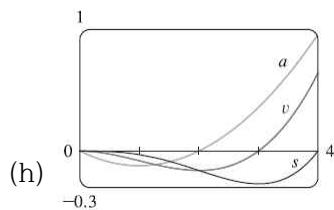
(g) $6t - 24$; -6 m/s^2 (h)



25. (a) $0.04t^3 - 0.12t^2$ (b) 0 m/s (c) $t = 0, 3$ (d) $t > 3$ (e) 21.02 m



(g) $0.12t^2 - 0.24t$; 0.36 m/s^2



26. (a) $t = 4 \text{ s}$ (b) $t = 1.5 \text{ s}$; 속도가 최소

27. (a) 7.56 m/s (b) 6.24 m/s ; -6.24 m/s

28. (a) $C'(x) = 12 - 0.2x + 0.0015x^2$ (b) 32 달러/m ; 201 m 를 생산하는 비용
(c) 32.20 달러

29. (a) $160\pi \text{ cm}^2/\text{cm}$ (b) $320\pi \text{ cm}^2/\text{cm}$ (c) $480\pi \text{ cm}^2/\text{cm}$
; 반지름이 증가할 때 표면적의 증가율

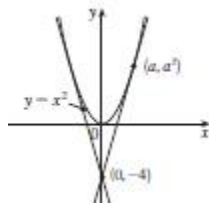
30. (a) $V = 5.3/P$

(b) -0.00212 ; 25°C 에서 압력에 관한 부피의 순간변화율; m^3/kPa

31.
$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{\frac{1}{x+h} - \frac{1}{x}}{h} = \lim_{h \rightarrow 0} \frac{x - (x+h)}{hx(x+h)}$$
$$= \lim_{h \rightarrow 0} \frac{-h}{hx(x+h)} = \lim_{h \rightarrow 0} \frac{-1}{x(x+h)} = -\frac{1}{x^2}$$

32. $f(x) = \cos x \Rightarrow$

$$\begin{aligned}
 f'(x) &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{\cos(x+h) - \cos x}{h} = \lim_{h \rightarrow 0} \frac{\cos x \cos h - \sin x \sin h - \cos x}{h} \\
 &= \lim_{h \rightarrow 0} \left(\cos x \frac{\cos h - 1}{h} - \sin x \frac{\sin h}{h} \right) = \cos x \lim_{h \rightarrow 0} \frac{\cos h - 1}{h} - \sin x \lim_{h \rightarrow 0} \frac{\sin h}{h} \\
 &= (\cos x)(0) - (\sin x)(1) = -\sin x
 \end{aligned}$$



33. $A = -\frac{3}{10}, B = -\frac{1}{10}$

34. $(\pm 2, 4)$

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

36. $y = \frac{3}{16}x^3 - \frac{9}{4}x + 3$

37. $y = 2x^2 - x$

38. 1000

39. $37\frac{1}{2}; 17\frac{1}{2}$

연습문제 2.4

01. $1 - 2x + 6x^2 - 8x^3$

02. $g'(t) = 3t^2 \cos t - t^3 \sin t$

03. $F'(y) = 5 + 14/y^2 + 9/y^4$

04. $f'(x) = \cos x - \frac{1}{2} \csc^2 x$

05. $h'(\theta) = \csc \theta - \theta \csc \theta \cot \theta + \csc^2 \theta$

06. $g'(x) = \frac{10}{(3-4x)^2}$

07. $y' = \frac{x^2(3-x^2)}{(1-x^2)^2}$

08. $y' = 2v - 1/\sqrt{v}$

09. $f'(t) = \frac{4+t^{1/2}}{(2+\sqrt{t})^2}$

10. $y' = \frac{2 - \tan x + x \sec^2 x}{(2 - \tan x)^2}$

11. $f'(\theta) = \frac{\sec \theta \tan \theta}{(1 + \sec \theta)^2}$

12. $y' = \frac{(t^2 + t) \cos t + \sin t}{(1 + t)^2}$

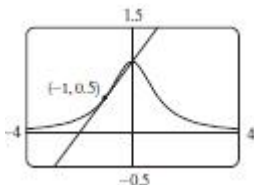
13. $f'(x) = 2cx/(x^2 + c)^2$

14. $y = \frac{2}{3}x - \frac{2}{3}$

15. $y = -0.03x + 0.52$

16. $y = x - \pi - 1$

17. $y = 2x - \pi$



18. (a) $y = \frac{1}{2}x + 1$ (b)

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

20. $\theta \cos \theta + \sin \theta; 2 \cos \theta - \theta \sin \theta$

21. $\frac{d}{dx}(\csc x) = \frac{d}{dx}\left(\frac{1}{\sin x}\right) = \frac{(\sin x)(0) - 1(\cos x)}{\sin^2 x} = \frac{-\cos x}{\sin^2 x} = -\frac{1}{\sin x} \cdot \frac{\cos x}{\sin x} = -\csc x \cot x$

$$22. \frac{d}{dx}(\sec x) = \frac{d}{dx}\left(\frac{1}{\cos x}\right) = \frac{(\cos x)(0) - 1(-\sin x)}{\cos^2 x} = \frac{\sin x}{\cos^2 x} = \frac{1}{\cos x} \cdot \frac{\sin x}{\cos x} = \sec x \tan x$$

$$23. \frac{d}{dx}(\cot x) = \frac{d}{dx}\left(\frac{\cos x}{\sin x}\right) = \frac{(\sin x)(-\sin x) - (\cos x)(\cos x)}{\sin^2 x} = -\frac{\sin^2 x + \cos^2 x}{\sin^2 x} = -\frac{1}{\sin^2 x} = -\csc^2 x$$

$$24. (a) -16 \quad (b) -\frac{20}{9} \quad (c) 20 \quad 25. (a) 0 \quad (b) -\frac{2}{3}$$

$$26. (a) y' = xg'(x) + g(x) \quad (b) y' = [g(x) - xg'(x)]/[g(x)]^2 \\ (c) y' = [xg'(x) - g(x)]/x^2$$

$$27. 2개, \left(-2 \pm \sqrt{3}, \frac{1}{2}(1 \mp \sqrt{3})\right) \quad 28. 1$$

$$29. (a) v(t) = 8 \cos t, a(t) = -8 \sin t$$

$$(b) 4\sqrt{3}, -4, -4\sqrt{3}; \text{ 왼쪽으로; 속력이 증가}$$

$$30. -0.2436 \text{ K/min}$$

$$31. (a) \text{ 생략} \quad (b) y' = \sin x \cos x + x \cos^2 x - x \sin^2 x$$

$$32. (a) \text{ 생략} \quad (b) y' = -2x(2x^2 + 1)/(x^4 + x^2 + 1)^2$$

연습문제 2.5

$$01. \frac{4}{3\sqrt{(1+4x)^2}}$$

$$02. \pi \sec^2 \pi x$$

$$03. \frac{\cos x}{2\sqrt{\sin x}}$$

$$04. F'(x) = 10x(x^4 + 3x^2 - 2)^4(2x^2 + 3) \quad 05. F'(x) = -\frac{1}{\sqrt{1-2x}}$$

$$06. f'(z) = -\frac{2z}{(z^2 + 1)^2} \quad 07. y' = -3x^2 \sin(a^3 + x^3)$$

$$08. y' = \sec kx (kx \tan kx + 1)$$

$$09. f'(x) = (2x - 3)^3(x^2 + x + 1)^4(28x^2 - 12x - 7)$$

$$10. h'(t) = \frac{2}{3}(t+1)^{-1/3}(2t^2 - 1)^2(20t^2 + 18t - 1)$$

$$11. y' = \frac{-12x(x^2 + 1)^2}{(x^2 - 1)^4}$$

$$12. y' = (\cos x - x \sin x) \cos(x \cos x)$$

$$13. y' = (r^2 + 1)^{-3/2}$$

$$14. y' = (x \cos \sqrt{1+x^2})/\sqrt{1+x^2}$$

$$15. y' = 2 \cos(\tan 2x) \sec^2(2x)$$

$$16. y' = 4 \sec^2 x \tan x$$

$$17. y' = \frac{16 \sin 2x (1 - \cos 2x)^3}{(1 + \cos 2x)^5}$$

$$18. y' = -2 \cos \theta \cot(\sin \theta) \csc^2(\sin \theta)$$

$$19. y' = 3[x^2 + (1 - 3x)^5]^2 [2x - 15(1 - 3x)^4]$$

$$20. g'(x) = p(2r \sin rx + n)^{p-1} (2r^2 \cos rx)$$

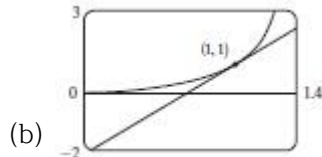
$$21. y' = \frac{-\pi \cos(\tan \pi x) \sec^2(\pi x) \sin \sqrt{\sin(\tan \pi x)}}{2\sqrt{\sin(\tan \pi x)}}$$

22. $y' = -2x \sin(x^2); y'' = -4x^2 \cos(x^2) - 2 \sin(x^2)$

23. $H'(t) = 3 \sec^3 3t; H''(t) = 18 \sec^2 3t \tan 3t$

24. $y = -x + \pi$

25. (a) $y = \pi x - \pi + 1$



26. $((\pi/2) + 2n\pi, 3), ((3\pi/2) + 2n\pi, -1), n$ 은 정수

27. 24

28. (a) 30 (b) 36

29. (a) $\frac{3}{4}$ (b) 존재하지 않는다. (c) -2

30. $-\frac{1}{6}\sqrt{2}$

31. 120

32. $-2^{50} \cos 2x$

33. (a) $dB/dt = \frac{7}{54}\pi \cos(2\pi t/5.4)$ (b) 0.16

34. 생략

35. $\frac{dv}{dt}$ 는 시간에 대한 속도의 변화율이다.; $\frac{dv}{ds}$ 는 변위에 대한 속도의 변화율이다.

36. (a) 생략 (b) $-n \cos^{n-1} x \sin[(n+1)x]$

37. 생략

38. 96

39. 생략

연습문제 2.6

01. (a) $y' = 9x/y$ (b) $y = \pm \sqrt{9x^2 - 1}, y' = \pm 9x/\sqrt{9x^2 - 1}$ (c) 생략

02. $y' = -x(3x + 2y)/(x^2 + 8y)$

03. $y' = \frac{2x + y}{2y - x}$

04. $y' = \frac{2x + y \sin x}{\cos x - 2y}$

05. $y' = \tan x \tan y$

06. $y' = \frac{y \sec^2(x/y) - y^2}{y^2 + x \sec^2(x/y)}$

07. $y' = \frac{4xy\sqrt{xy} - y}{x - 2x^2\sqrt{xy}}$

08. $y' = \frac{y \sin x + y \cos(xy)}{\cos x - x \cos(xy)}$

09. $-\frac{16}{13}$

10. $y = -x + 2$

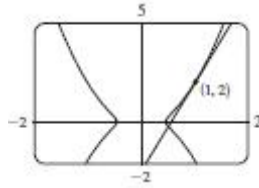
11. $y = x + \frac{1}{2}$

12. $y = -\frac{9}{13}x + \frac{40}{13}$

13. $-81/y^3$

14. $-2x/y^5$

15. (a) $y = \frac{9}{2}x - \frac{5}{2}$ (b)

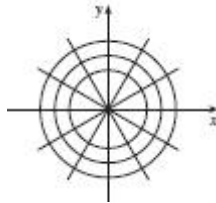


16. (a) : 8개; $x \approx 0.42, 1.58$

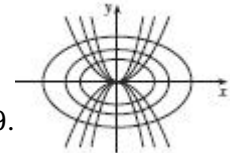
(b) $y = -x + 1, y = \frac{1}{3}x + 2$ (c) $1 \mp \sqrt{3}/3$ (d) 생략

17. $\left(\pm \frac{5}{4}\sqrt{3}, \pm \frac{5}{4}\right)$

18.



19.



20. (a) $\frac{V^3(nb - V)}{PV^3 - n^2aV + 2n^3ab}$

(b) -4.04 L/atm

21. 생략

22. $(\pm \sqrt{3}, 0)$

23. $(-1, -1), (1, 1)$

24. 생략

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

연습문제 2.7

01. $dV/dt = 3x^2 dx/dt$

02. $48 \text{ cm}^2/\text{s}$

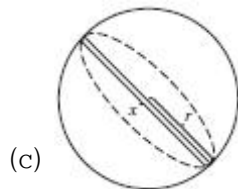
03. $3/(25\pi) \text{ m/min}$

04. (a) 1 (b) 25

05. -18

06. (a) 표면적의 감소율은 $1 \text{ cm}^2/\text{min}$ 이다.

(b) 지름이 10 cm 일 때 지름의 감소비율



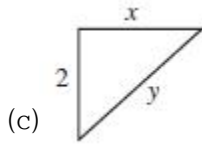
(c)

(d) $S = \pi x^2$

(e) $1/(20\pi) \text{ cm/min}$

07. (a) 비행기의 고도는 2 km , 속력은 800 km/h 이다.

(b) 비행기가 기지로부터 3 km 떨어져 있을 때 비행기에서 기지까지의 거리가 증가하는 비율



(d) $y^2 = x^2 + 4$

(e) $\frac{800}{3} \sqrt{5} \approx 596 \text{ km/h}$

08. 78 km/h

09. $8064/\sqrt{8334400} \approx 2.79 \text{ m/s}$

10. -1.6 cm/min

11. $\frac{720}{13} \approx 55.4 \text{ km/h}$

12. $2.1/\sqrt{33} \approx 0.37 \text{ m/s}$

13. $\frac{1}{3} \text{ m/min}$

14. $4/(3\pi) \approx 0.42 \text{ m/min}$

15. $0.3 \text{ m}^2/\text{s}$

16. 5 m

17. $80 \text{ cm}^3/\text{min}$

18. $\frac{107}{810} \approx 0.132 \Omega/\text{s}$

19. (a) 120 m/s (b) $\approx 0.107 \text{ rad/s}$

20. $1650/\sqrt{31} \approx 296 \text{ km/h}$

21. $\frac{7}{4} \sqrt{15} \approx 6.78 \text{ m/s}$

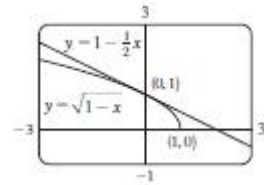
22. $18.6 \text{ mm/h} \approx 0.005 \text{ mm/s}$

연습문제 2.8

01. $L(x) = -10x - 6$

02. $L(x) = \frac{1}{4}x + 1$

03. $\sqrt{1-x} \approx 1 - \frac{1}{2}x$; $\sqrt{0.9} \approx 0.95$, $\sqrt{0.99} \approx 0.995$:



04. $-0.368 < x < 0.677$

05. $-0.045 < x < 0.055$

06. 15.968

07. 4.02

08. 생략

09. (a) $dy = \frac{\sec^2 \sqrt{t}}{2\sqrt{t}} dt$ (b) $dy = \frac{-4v}{(1+v^2)^2} dv$

10. (a) $dy = \sec^2 x dx$ (b) $dy = -0.2$, $\Delta y = -0.18237$

11. (a) 270 cm^3 , 0.01 , 1% (b) 36 cm^2 , $0.00\bar{6}$, $0.\bar{6}\%$

12. (a) $84/\pi \approx 27 \text{ cm}^2$; $\frac{1}{84} \approx 0.012$

(b) $1764/\pi^2 \approx 179 \text{ cm}^3$; $\frac{1}{56} \approx 0.018$

13. 생략

14. 반지름이 5% 증가하면 혈류는 20% 증가한다.

15. 생략

16. (a) 4.8 , 5.2 (b) 너무 크다.

2장 복습문제

참-거짓 질문

01. 거짓 02. 거짓 03. 참 04. 거짓 05. 참 06. 거짓

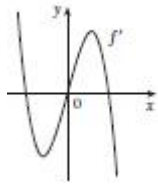
연습문제

01. $f''(5)$, 0 , $f'(5)$, $f'(2)$, 1 , $f'(3)$

02. (a) 이자율에 대한 비용의 변화율; 달러/(연간 %)

(b) 이자율이 10% 증가하면 비용이 1200달러/(연간 %)의 비율로 증가한다.

(c) 항상 양수이다.



03.

04. $a = f$, $c = f'$, $b = f''$

05. 유로 가격의 변화율이 연간 US 달러를 이용하여 2002년 반기 기점에 증가한다.: 0.151달러/년

06. $f'(x) = 3x^2 + 5$

07. $4x^7(x+1)^3(3x+2)$

08. $\frac{3}{2}\sqrt{x} - \frac{1}{2\sqrt{x}} - \frac{1}{\sqrt{x^3}}$

09. $x(\pi x \cos \pi x + 2 \sin \pi x)$

10. $\frac{8t^3}{(t^4+1)^2}$

11. $-\frac{\sec^2 \sqrt{1-x}}{2\sqrt{1-x}}$

12. $\frac{1-y^4-2xy}{4xy^3+x^2-3}$

13. $\frac{2 \sec 2\theta (\tan 2\theta - 1)}{(1 + \tan 2\theta)^2}$

14. $-(x-1)^{-2}$

15. $\frac{2x-y \cos(xy)}{x \cos(xy)+1}$

16. $-6x \csc^2(3x^2+5)$

17. $\frac{\cos \sqrt{x} - \sqrt{x} \sin \sqrt{x}}{2\sqrt{x}}$

18. $2 \cos \theta \tan(\sin \theta) \sec^2(\sin \theta)$

19. $\frac{1}{5}(x \tan x)^{-4/5}(\tan x + x \sec^2 x)$

20. $\cos(\tan \sqrt{1+x^3})(\sec^2 \sqrt{1+x^3}) \frac{3x^2}{2\sqrt{1+x^3}}$

21. $-\frac{4}{27}$

22. $-5x^4/y^{11}$

23. $y = 2\sqrt{3}x + 1 - \pi\sqrt{3}/3$

24. $y = 2x + 1$; $y = -\frac{1}{2}x + 1$

25. $(\pi/4, \sqrt{2})$, $(5\pi/4, -\sqrt{2})$

26. (a) 2 (b) 44

27. $f'(x) = 2xg(x) + x^2g'(x)$

28. $f'(x) = 2g(x)g'(x)$

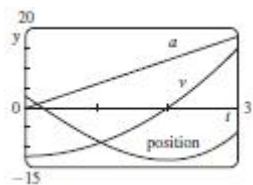
29. $f'(x) = g'(g(x))g'(x)$

30. $f'(x) = g'(\sin x) \cdot \cos x$

31. $h'(x) = \frac{f'(x)[g(x)]^2 + g'(x)[f(x)]^2}{[f(x) + g(x)]^2}$

32. -4 (불연속 점), -1(뾰족한 점), 2(불연속 점), 5(수직접선)

33. (a) $v(t) = 3t^2 - 12$, $a(t) = 6t$ (b) $t > 2$ 일 때 위쪽, $0 \leq t < 2$ 일 때 아래쪽



(c) 23 (d)

34. $\frac{4}{3} \text{ cm}^2/\text{min}$

35. $117/\sqrt{666} \approx 4.53 \text{ m/s}$

36. 400 ft/h

37. (a) $L(x) = 1 + x$; $\sqrt[3]{1+3x} \approx 1 + x$; $\sqrt[3]{1.03} \approx 1.01$

(b) $-0.23 < x < 0.40$

38. $12 + 3\pi/2 \approx 16.7 \text{ cm}^2$

39. $\frac{1}{32}$

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

41. $3\sqrt{2}$
