# Chapter 1 & 3 Solutions

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## Section 1.2:

5. $3x^2 + 6x + 4$; $3x^2 + 2x - 14$; $6x^3+35x^2+26x-45$; $\frac{3x^2+4x-5}{2x+9}, x \neq -\frac{9}{2}$;

6. $2x + 11$; $2x + 8$

7. $2x^2 - 4x - 3$; $4x^2 - 16x + 15$

8. All reals, $x \neq -2$

12. $\frac{x^3+x^2-1}{x+1}, x \neq -1$; $\frac{-x^3-x^2+2x+1}{x+1}, x \neq -1$; $x^2 - x$, $x \neq -1$; $\frac{x}{x^3+x^2-x-1}, x \neq 1 \; or \; -1$

13. $\frac{x^3-2x^2-35x+3}{x-7}, x \neq 7$; $-\frac{x^3-2x^2-35x-3}{x-7}, x \neq 7$; $\frac{3x^2+15x}{x-7}, x \neq 7$; $\frac{3}{x^3+2x^2-35x}, x \neq -5, 0, 7$

16. $\frac{1}{2}x - 4$; $\frac{1}{2}x - 1$

18. $25x^4 - 1$; $5x^4 - 10x^2 + 5$

20. $x^2 + 5x + 7$; $x^2 + 7x + 12$

21. $\frac{x}{x-1}, x \neq 1$; $\frac{1}{x}, x \neq 0$

22. All reals

23. All reals, $x \neq 7$

24. $x \leq \frac{1}{8}, x \neq 0$

28. Yes; students should show discounted total with tax as evidence

31. a. *h(f(x))*; b. $3750;

39. C

# Chapter 1 & 3 Solutions

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## Section 1.4:

12. $y = 8x + 61$

14. $y = -12x + \frac{1}{2}$

16. $x = 12$

18. $\frac{5}{8}$

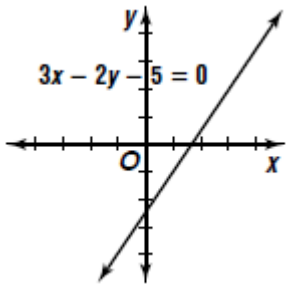
20. $x = -4$

22. $y = 0.25x - 6$

23. $x + 2y = -10$

24. $x + y = -2$

30.




32. -24

# Chapter 1 & 3 Solutions

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## Section 1.5:

18. none of these; students should prove using slopes

19. coinciding; students should prove using slopes and y-intercepts

20. parallel; students should prove using slopes

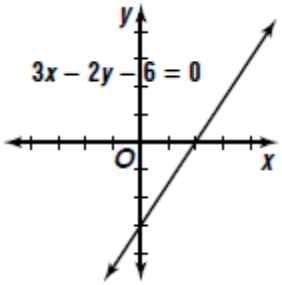
22. $2x - y - 8 = 0$

24. $y + 11 = 0$ or $y = -11$

25. $x + 5y + 15 = 0$

27. $y + 13 = 0$ or $y = -13$

37.




38. $x^2 - 1$

# Chapter 1 & 3 Solutions

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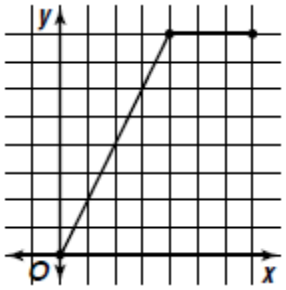
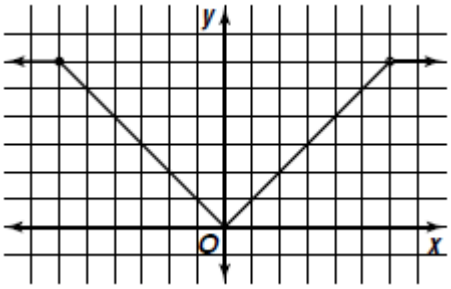
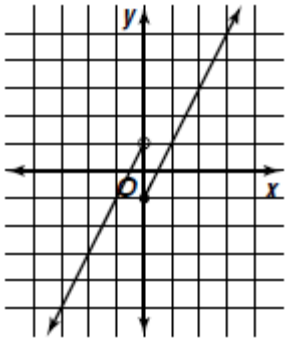
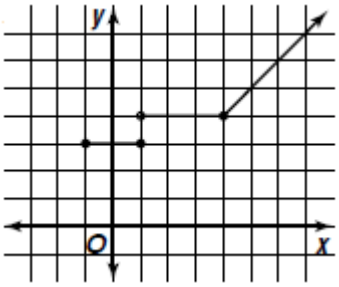
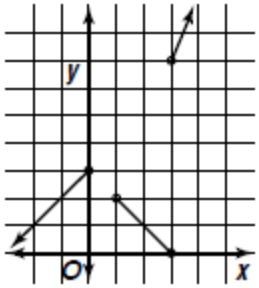
## Section 1.7:

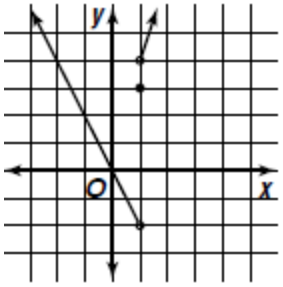
5. 


6. 


11. 


16. 


19. 


20. 


32. $2x - y - 6 = 0$

34. $p(x) = 399.9x - 0.2x^2 - 200$

35. \$47.92

# Chapter 1 & 3 Solutions

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## Section 3.1:

14. yes; show work as proof of answer

15. no; show work as proof of answer

17. yes; show work as proof of answer

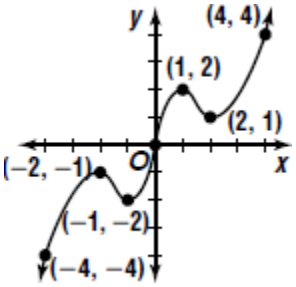
18. yes; show work as proof of answer

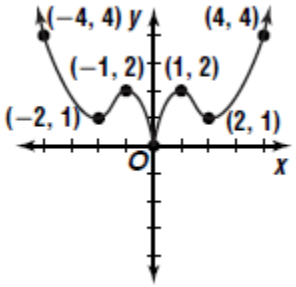
21. x-axis (no), y-axis (no), y = x (yes), y = -x (yes); students show work for evidence of proof

22. x-axis (yes), y-axis (no), y = x (no), y = -x (no); students show work for evidence of proof

23. none of them; students show work for evidence of proof

25. all of them; students show work for evidence of proof

28. 


29. 


32. x-axis (no), y-axis (yes); students show work for evidence of proof

35. both of them: show work as proof of answer

36. neither of them; show work as proof of answer

# Chapter 1 & 3 Solutions

These answers are to be used to check against your solutions. Your homework should show all of your work, not just the answers!

## Section 3.2:

13. up 6 units

14. compressed vertically by $\frac{3}{4}$

15. compressed horizontally by $\frac{1}{5}$

16. right 5 units

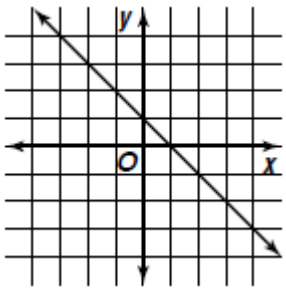
20. a) flipped over the x-axis and compressed horizontally by $\frac{2}{3}$
    b) right 3 units, expanded vertically by 4
    c) compressed vertically by $\frac{1}{2}$ and down 5 units

21. a) expanded horizontally by 5
    b) expanded vertically by 7, down 0.4 units
    c) reflected over the x-axis, left 1 unit, expanded vertically by 9

22. a) left 2 units and down 5 units
    b) expanded horizontally by 1.25, reflected over the x-axis
    c) compressed horizontally by $\frac{3}{5}$, and up 3 units

23. a) left 2 units, compressed vertically by $\frac{1}{3}$
    b) reflected over the y-axis, and down 7 units
    c) expanded vertically by 2, right 3 units, and up 4 units

24. a) expanded horizontally by 2
    b) compressed horizontally by $\frac{1}{6}$ and up 8 units
    c) positive x-values are reflected over the y-axis

28. 

# Chapter 1 & 3 Solutions

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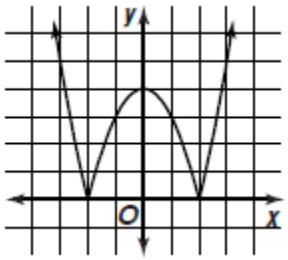
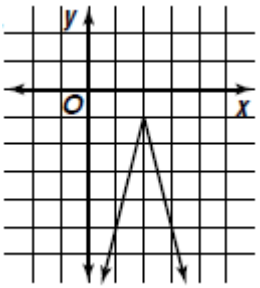
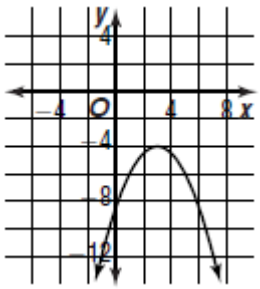
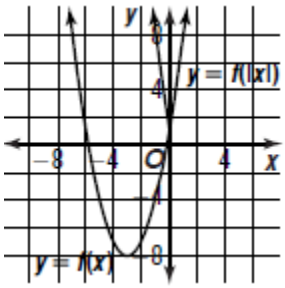
## Section 3.2 continued:

29. 


32. 


33. 


34. 


44. yes; show work as proof of answer

# Chapter 1 & 3 Solutions

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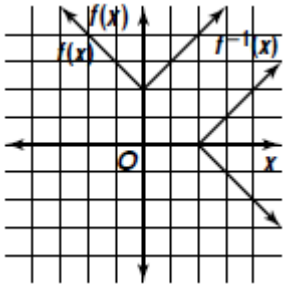
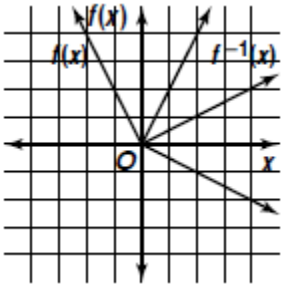
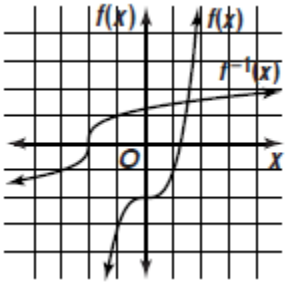
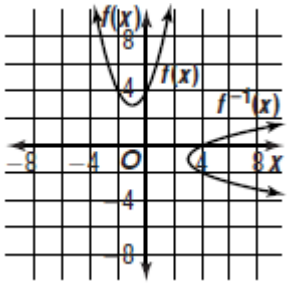
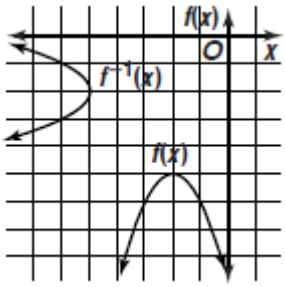
## Section 3.4:

15. 


16. 


17. 


21. 


22. 


25. $f^{-1}(x) = \frac{x-7}{2}$ ; yes

26. $f^{-1}(x) = -x - 2$ ; yes

27. $f^{-1}(x) = \frac{1}{x}$ ; yes

28. $f^{-1}(x) = \pm\sqrt{-\frac{1}{x}}$ ; no

29. $f^{-1}(x) = 3 \pm \sqrt{x-7}$ ; no

42. a) $h = \frac{v^2}{64}$ b)Yes – student needs number

56. C

# Chapter 1 & 3 Solutions

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## Section 3.5:

18. Jump Discontinuity

19. x = 0 (one possible answer); when x = 0, the graph is undefined

20. $x \to -\infty, f(x) \to -\infty; x \to \infty, f(x) \to \infty$

21. $x \to -\infty, f(x) \to -\infty; x \to \infty, f(x) \to -\infty$

22. $x \to -\infty, f(x) \to \infty; x \to \infty, f(x) \to \infty$

23. $x \to -\infty, f(x) \to \infty; x \to \infty, f(x) \to \infty$

24. $x \to -\infty, f(x) \to 0; x \to \infty, f(x) \to 0$

25. $x \to -\infty, f(x) \to 2; x \to \infty, f(x) \to 2$

40. $f^{-1}(x) = -5 \pm \sqrt{x}$

41. left 2 units and down 4 units

# Chapter 1 & 3 Solutions

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## Section 3.6:

13. abs max (-4, 1)

14. abs max (-1, 2); rel min (0.5, 0.5); rel max (1.5, 2)

15. rel max (-2, 7); abs min (3, -3)

16. rel max (-6, 4); rel min (-2, -3)

17. abs min (3, -8); rel max (5, -2); rel min (8, -5)

18. none

19. abs max (1.5, -1.75)

20. rel max (-1.53, 1.13); rel min (1.53, -13.13)

21. rel max (-0.59, 0.07); rel min (0.47, -3.51)

22. abs min (-1.41, -6) and (1.41, -6); rel max (0, -2)

23. rel max (-1, 1); rel min (0.25, -3.25)

24. none

25. abs min (-3.18, -15.47); rel min (0.34, -0.80); rel max (-0.91, 3.04)

26. point of inflection

27. max

28. min

29. max

30. min

31. point of inflection

# Chapter 1 & 3 Solutions

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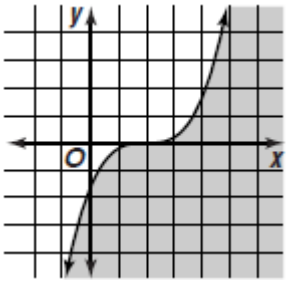
## Section 3.6 continued:

35. a) $V(x) = 2x(12.5 - 2x)(17 - 2x)$ b) 2.37cm by 2.37cm

37. $f(x) = 5000\left(\sqrt{x^2 + 4}\right) + 3500(10 - x)$

42. 

# Chapter 1 & 3 Solutions

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## Section 3.7:

14. x = 4, y = 2

15. x = -6, no horizontal asymptote

16. $x = \frac{1}{2}$, x = 5, y = 0

17. x = -1, x = -3, y = 0

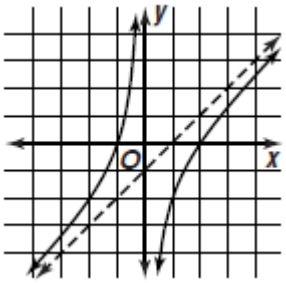
30. y = x – 1

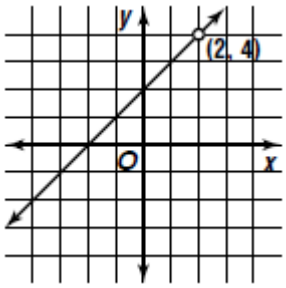
31. y = x + 3

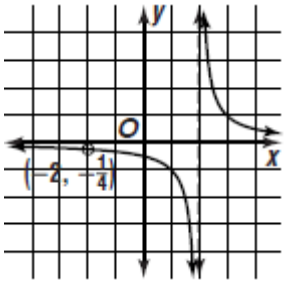
32. y = x - 2

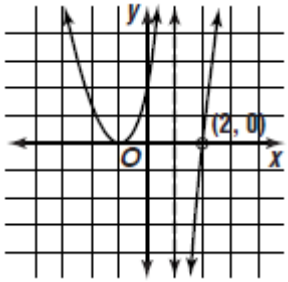
33. $y = \frac{1}{2}x - \frac{5}{4}$

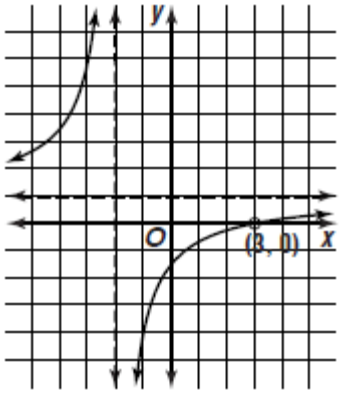
34. no slant asymptote

35. 


36. 


37. 


38. 


39. 


43. $f(x) = \frac{(x-2)(x+3)(x+5)^2}{(x-4)(x+5)}$; this is one possible answer

48. abs max (2, 1)

49. $y = \pm\sqrt{x+9}$

55. $f(g(x)) = 2 - 64x^2$