

Section 3.4 Answers

1. $x \neq 0$

2. $x \neq 3, -2$

3. $x \neq 0, \pm\sqrt{\frac{5}{2}}$

4. all real numbers

5. $x \neq 2$

6. $x \neq -\frac{2}{3}, 5$

7. $5, -5$

8. $-2, -3$

9. none

10. $0, 2$

11. H.A.: $y = 0$
V.A.: $x = -1$

12. H.A.: $y = 1$
V.A.: $x = 3$

13. H.A.: $y = 2$
V.A.: $x = 5, x = -1$

14. H.A.: $y = \frac{1}{2}$
V.A.: $x = \frac{1}{2}$

15. H.A.: $y = 0$
V.A.: $x = 0$

16. H.A.: $y = 0$
V.A.: $x = 0$

17. H.A.: $y = 1$
V.A.: $x = 3, x = 1$

18. H.A.: $y = 0$
V.A.: none

19. H.A.: none
V.A.: none

20. H.A.: $y = 0$
V.A.: $x = 0, x = -1$

21. H.A.: $y = 0$
V.A.: $x = -1, x = 1$

22. H.A.: $y = \frac{1}{3}$
V.A.: $x = 0$

23. H.A.: $y = \frac{3}{2}$
V.A.: $x = \frac{5 + \sqrt{41}}{4},$
 $x = \frac{5 - \sqrt{41}}{4}$

24. H.A.: $y = 1$
V.A.: $x = -6$

25. a) $x \neq \pm 2$

b) 0

c) $x = 2, x = -2$

d) $y = 2$

e) 0

26. a) $x \neq \pm 5$

b) 0

c) $x = 5, x = -5$

d) $y = 5$

e) 0

27. a) $(-\infty, \infty)$

b) -1

c) none

d) $y = 0$

e) 1

28. a) $(-\infty, \infty)$

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

c) none

d) $y = 0$

e) 4

29. a) $x \neq 3, -1$

b) 0

c) $x=3, x=-1$

d) none

e) 0

30. a) $x \neq 2, -1$

b) 0

c) $x=2, x=-1$

d) none

e) 0

31. a) $x \neq 3, -2$

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

c) $x=3, x=-2$

d) $y = 0$

e) 4

32. a) $x \neq -3, 2$

b) $-\frac{1}{3}$

c) $x=-3, x=2$

d) $y = 0$

e) -2

33. a) $x \neq \pm 2$

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

c) $x=-2, x=2$

d) $y = 1$

e) -1

34. a) $w \neq \pm 7$

b) $-\frac{4}{49}$

c) $w=7, w=-7$

d) $y = 1$

e) -2

35. a) $x \neq \pm 2$

b) 3

c) $x=-2, x=2$

d) $y = 1$

e) $-4, 3$

36. a) $x \neq \pm 5$

b) $\frac{1}{5}$

c) $x = -5$

d) $y = 1$

e) -1

37. a) $d \neq -\frac{1}{2}, -\frac{8}{3}$

b) $-\frac{5}{4}$

c) $d = -\frac{8}{3}$

d) $y = \frac{4}{3}$

e) $\frac{5}{2}$

38. a) $x \neq 1, 3$

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

c) $x = 1$

d) $y = \frac{4}{3}$

e) $\frac{1}{2}$

c) $x = 1$

40. a) $y \neq -\frac{7}{2}, -\frac{1}{3}$

d) $w = 2$

b) none

e) -1

c) $x=1, x = -1$

43. a) $x \neq 0, -\frac{1}{3}$

d) $y = 0$

b) none

e) $\frac{3}{25}$

39. $x \neq -\frac{2}{5}, 1$

d) $y = 10$

b) 21

e) none

c) $x = 0, x = -4$

42. a) $x \neq \pm 1$

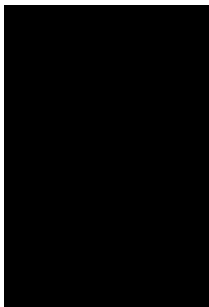
d) $y = 0$

b) none

e) $-\frac{2}{21}$

c) $x=0, x = -\frac{1}{5}$

45. $f(x) = \frac{(x-2)(x-5)}{x-1}$



b) -4

e) none

c) $y = -\frac{1}{3}$

41. a) $x \neq 0, 4, -4$

d) $y = 0$

b) $-\frac{4}{3}$

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

c) $x=0, x = -\frac{1}{3}$

44. a) $x \neq 0, -\frac{1}{5}$

d) $y = 0$

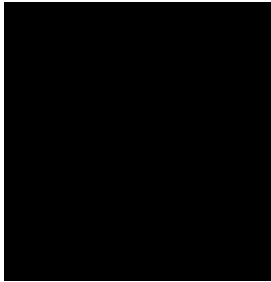
46. $g(x) = \frac{x-1}{x^2-4}$



$$47. K(x) = \frac{2x}{x+2}$$



$$48. d(x) = \frac{x}{x^2 - 9}$$



$$49. h(x) = \frac{5(x-3)}{x-2}$$



$$50. P(x) = \frac{2(x+1)(x-1)}{(x+2)(x-2)}$$



$$51. a) \bar{C}(x) = \frac{3500 + .01x}{x}$$

b) H.A.: $\bar{C} = .01$
As the number of copies gets larger and larger, the average cost per copy gets closer to \$.01.

$$52. a) \bar{C}(x) = \frac{4500 + 35x}{x}$$

b) H.A.: $\bar{C} = 35$
As the number of orders gets larger and larger, the average cost per order gets closer to \$35.

$$53. a) C(x) = 100,000 + 100x$$

$$b) \bar{C}(x) = \frac{100000 + 100x}{x}$$

c) $\bar{C}(4000) = 125$
When 4000 bikes are produced in a month, the average cost per bike is \$125.

d) H.A.: $\bar{C} = 100$
As the number of bikes produced gets very large, the average cost per bike approaches \$100.

$$54. a) C(x) = 300,000 + 30x$$

$$b) \bar{C}(x) = \frac{300,000 + 30x}{x}$$

c) $\bar{C}(10,000) = 60$
When 10,000 pairs of shoes are produced in a month, the average cost per pair is \$60.

d) H.A.: $\bar{C} = 30$
When the number of pairs of shoes gets very large, the average cost per pair approaches \$30.

55. a) $N(5) = 304,000$
 $N(10) = 453,333$
 $N(25) = 702,222$

b) H.A.: $N = 1200$
As time goes by, the number of fish in the lake will approach 1,200,000.

56. H.A.: $C = 0$
As time goes by, the concentration of the chemical gets lower and lower, approaching 0.

57. a) \$4.25

b) H.A.: $I = .25$
When the number of units gets very large, the inventory cost approaches \$.25.

58. a) $N(1) = 35 \rightarrow$ After 1 day the students remembered an average of 35 words.
 $N(5) = 11 \rightarrow$ After 5 days they remembered an average of 11 words.
 $N(15) = 7 \rightarrow$ After 15 days they remembered an average of 7 words.

b) As the time increases, the number of words remembered approaches 5.

59. a) $C(x) = \frac{2500 + 9.25x}{x}$

b) \$21.75 (for 200 units)
\$14.25 (for 500 units)

c) H.A.: $C = 9.25$
As the number of units gets very large, the average cost per unit approaches \$9.25.

60. a) 2 yrs. \rightarrow 1,687,500
3 yrs. \rightarrow 2,489,362
10 yrs. \rightarrow 3,843,750

b) H.A.: $N = 4000$
As time goes by, the cumulative number of units sold will approach 4,000,000.

61. \$60,300

62. a) $P(15) = 10,170$
 $P(30) = 10,332$
 $P(60) = 10,416$

b) H.A.: $P = 10,500$
As time goes by, the number of goats approaches 10,500.