Chapter 3

Answers

Exercise 1 .

1. $x - 17 = 23$ and $x = 40$ Add 17 to each side. $40 - `7 = 23$
2. $x + 8 = 3$ and $x = -5$ Subtract 8 on each side. $-5 + 8 = 3$
3. $x - 10 = 3$ and $x = 13$ Add 10 to each side. $13 - 10 = 3$
4. $x + 17 = 23$ and $x = 6$ Subtract 17 on each side. $6 + 17 = 23$
5. $x - 1 = -3$ and $x = -2$ Add 1 to each side. $-2 - 1 = -3$
6. $2x = 24$ and $x = 12$ Divide each side by 2. $2 \times 12 = 24$
7. $2x = -8$ and $x = -4$ Divide each side by 2. $2 \times (-4) = -8$
8. $-2x = -8$ and $x = 4$ Divide each side by -2. $-2 \times 4 = -8$
9. $-2x = 8$ and $x = -4$ Divide each side by -2. $-2 \times (-4) = -8$
10. $3x = 18$ and $x = 6$ Divide each side by 3. $3 \times 6 = 18$
11. $3x = -18$ and $x = -6$ Divide each side by 3. $3 \times (-6) = -18$
12. $-3x = 18$ and $x = -6$ Divide each side by -3. $-3 \times (-6) = 18$
13. $-3x = -18$ and $x = 6$ Divide each side by -3. $-3 \times 6 = -18$
14. $\frac{1}{2}x = 2$ and $x = 4$ Multiply each side by 2. $\frac{1}{2}(4) = 2$

15. $\frac{1}{2}x = 10$ and $x = 20$ Multiply each side by 2. $\frac{1}{2}(20) = 10$

16. $\frac{1}{3}x = 2$ and $x = 6$ Multiply each side by 3. $\frac{1}{3}(6) = 2$

17. $\frac{1}{4}x = 2$ and $x = 8$ Multiply each side by 4. $\frac{1}{2}(8) = 4$

18. $-\frac{1}{2}x = 2$ and $x = -4$ Multiply each side by -2. $-\frac{1}{2}(-4) = 2$

19. $\frac{2}{5}x = 2$ and $x = 5$ Multiply each side by $\frac{5}{2}$. $\frac{2}{5}(5) = 2$

20. $-\frac{1}{2}x = -\frac{1}{2}$ and $x = 1$ Multiply each side by -2. $-\frac{1}{2}(1) = -\frac{1}{2}$

Exercise 2 *Solve each equation below. Say what two operations you do to get the solution. Pay attention to the order in which you do them.*

1. $2x - 3 = 9$, Solution is: 6

2. $2x + 8 = 14$, Solution is: 3

3. $3x - 14 = 43$, Solution is: 19

4. $7x + 13 = 55$, Solution is: 6

5. $9x - 3 = 96$, Solution is: 11

6. $4x - 320 = 900$, Solution is: 305

7. $13x - 3 = 66$, Solution is: $\frac{69}{13}$

8. $\frac{x}{2} + 4 = 9$, Solution is: 10

9. $\frac{x}{3} + 1 = 4$, Solution is: 9

10. $\frac{x}{4} - 5 = 7$, Solution is: 48

Exercises

1. .

(**a**) 8	(**c**) 4	(**e**) -3	(**g**) 4	(**i**) -1
(**b**) 9	(**d**) 19	(**f**) -7	(**h**) -6	(**j**) -2

2. .

(**a**)

0 **(c)** 03 **(e)** 8 **(g)** 9 **(i)** -4

(b) 0 **(d)** 054 **(f)** 0 **(h)** -3 **(j)** -3

3. .

(a) $8x$
(b) $9x$
(c) $4x, 3$
(d) $19x, 54$
(e) $-3x, 8$
(f) $-7x$
(g) $9, 4x$
(h) $-6x, -3$
(i) $-x, -4$
(j) $-3, -2x$

4. .

(a) $8x + 9$
(b) $11x + 8$
(c) $7x + 10$
(d) $12x + 9$
(e) $18x + 15$

5. a) 25 b) 30 c) 24 d) 33 e) 51

6. a) 33 b) 41 c) 31 d) 45 e) 69

7. .

(a) $x + (-5)$
(b) $2x + (-9)$
(c) $8 + (-x)$
(d) $5 + (-2x)$
(e) $-2x + (-8)$
(f) $-4x + (-6)$
(g) $4 + (-3x)$
(h) $-7 + (-2x)$
(i) $3x + (-5)$
(j) $8x + (-9) + (-x)$
(k) $8x + (-3)$
(l) $9 + (-4x)$
(m) $-3x + (-5)$
(n) $-11x + (-10)$
(o) $41 + (-82x)$
(p) $-72x + (-112)$
(q) $2x + (-3y) + (-4)$
(r) $3 + (-x) + (-y)$

8. The answer is 1 no matter what number you use for x..

9. .

(a) $5x + 1x$
(b) $-3x + 1x$
(c) $8x + (-1)x$
(d) $1x + 3x$
(e) $2x + 1x + (-1)x$
(f) $1x + 7x$
(g) $(-1)x + 10x$
(h) $(-1)x + 1x$
(i) $1x + 1x + 1x + 1x$
(j) $6x + (-1)x + 3$
(k) $4x + (-1)x + 5 + 1x$
(l) $1x + (-1)x + 1x + (-1)x + 1x$

10. .

(**a**) $6x$
(**b**) $-2x$
(**c**) $7x$
(**d**) $4x$
(**e**) $2x$
(**f**) $9x$
(**g**) 0
(**h**) $5x + 3$
(**i**) $4x + 5$
(**j**) x

11. .

(**a**) $3x + 7 + 5x + 8 = 8x + 15$
(**b**) $7x + 1 + 4x + 2 = 11x + 3$
(**c**) $8x - 1 + x - 1 = 9x - 2$
(**d**) $(x + 3) + (2x + 7) = 3x + 10$
(**e**) $(-8x + 7) + (9x + 2) = x + 9$
(**f**) $(10x - 8) + (3x - 9) = 13x - 17$
(**g**) $x + 2x = 3x$
(**h**) $x - 2x = -x$
(**i**) $x - 1 + 7 - 7x$
(**j**) $6x + (x + 1) = 7x + 1$
(**k**) $5x - (x - 1) = 4x + 1$
(**l**) $8x + 5 - (3x + 2) = 5x + 3$
(**m**) $6x + 1 - (5x + 4) = x - 3$
(**n**) $(3x + 4) - (x + 1) - (x + 1) = x + 2$
(**o**) $x - (x + 1) = -1$
(**p**) $2x - (x + 3) = x - 3$
(**q**) $2x - (x - 3) = x + 3$
(**r**) $3x - 5 - x - (x - 1) = x - 4$
(**s**) $4x - 3 - (4x - 3) = 0$
(**t**) $7x + 5 - (7x + 5) = 0$
(**u**) $x - x + x - x + x - x = 0$
(**v**) $2(x + 1) + 3(x + 1) = 5x + 5$
(**w**) $5x + 4 - 2(x + 2) = 3x$
(**x**) $3(x - 1) - 3(x - 1) = 0$
(**y**) $10(x + 3) - 9(x + 3) = x + 3$
(**z**) $9(2x + 4) - 8(x + 5) = 10x - 4$

Exercises.

1. $x - 8 = 15$, Solution is: 23

2. $t + 4 = 17$, Solution is: 13

3. $x - 32.4 = 63.6$, Solution is: $x = 96.0$

4. $x - 5.3 = 15.2$, Solution is: $x = 20.5$

5. $t + 7.1 = 19.4$, Solution is: $t = 12.3$

6. $x - 9 = 38$, Solution is: 47

7. $x - 51 = 152$, Solution is: 203

8. $t + 6 = 170$, Solution is: 164

9. $x - 18 = 41$, Solution is: 59

10. $r + 18.5 = 20.5$, Solution $\{[r = 2.0]\}$

11. $x - 8 = 1$, Solution is: 9

12. $7 = x + 4$, Solution is: 3

13. $x + 2.4 = 3.6$, Solution is: 1.2

14. $x - 41 = -10$, Solution is: 31

15. $x + 7 = -12$, Solution is: -19

16. $x - (-9) = 18$, Solution is: 9

17. $x - 5 = -15$, Solution is: -10

18. $t + 4 = 1$, Solution is: -3

19. $x - 18 = 4$, Solution is: 22

20. $r - 18 = -20$, Solution is: -2

21. $8x = 16$, Solution is: 2

22. $4t = 92$, Solution is: 23

23. $3x = 63.6$, Solution is: $x = 21.2$

24. $5x = 15.5$, Solution is: 3.1

25. $7.1t = 19.4$, Solution is: 2.7324

26. $9p = 38$, Solution is: $\frac{38}{9}$

27. $2.4x = 9.6$, Solution is: $x = 4.0$

28. $18t = 180$, Solution is: 10

29. $7x = 41$, Solution is: $\frac{41}{7}$

30. $5.8r = 20.5$, Solution is: $r = 3.5345$

31. $-8x = 16$, Solution is: -2

32. $4t = -32$, Solution is: -8

33. $3x = -36$, Solution is: -12

34. $5x = -35$, Solution is: -7

35. $7.1t = -31.9$, Solution is: $t = -4.4930$

36. $-4p = 38$, Solution is: $-\frac{19}{2}$

37. $2.4 = -9.6x$, Solution is: $\{[x = -0.25]\}$

38. $-54 = 18x$, Solution is: -3

39. $7 = 41x$, Solution is: $\frac{7}{41}$

40. $-4.3r = 20.5$, Solution is: $r = -4.7674$

41. $2x - 8 = 14$, Solution is: 11

42. $3t + 4 = 18$, Solution is: $\frac{14}{3}$

43. $2x - 32 = 66$, Solution is: 49

44. $5x - 3 = 22$, Solution is: 5

45. $2t + 7.1 = 19.4$, Solution is: 6.15

46. $4x - 9 = 38$, Solution is: $\frac{47}{4}$

47. $6x - 51 = 152$, Solution is: $\frac{203}{6}$

48. $164x + 6 = 170$, Solution is: 1

49. $x - 18 = 2x + 42$, Solution is: -60

50. $4r + 18 = r + 33$, Solution is: 5

51. $2x - 8 = -15$, Solution is: $-\frac{7}{2}$

52. $3t + 4 = t + 18$, Solution is: 7

53. $7x - 32 = x + 16$, Solution is: 8

54. $5x - 5.3 = 3x - 15.2$, Solution is: -4.95

55. $4x + 7.1 = 3x + 19.4$, Solution is: 12.3

56. $8x - 9 = 7x - 3$, Solution is: 6

57. $5.1x - 51 = 0$, Solution is: 10.0

58. $3t + 6 = 8t - 17$, Solution is: $\frac{23}{5}$

59. $2(x + 3) = 6x$, Solution is: $\frac{3}{2}$

60. $x - 2(x + 1) = x + 1$, Solution is: $-\frac{3}{2}$

61. $2x - 8 = -20$, Solution is: -6

62. $3t + 4 = -8$, Solution is: -4

63. $2x - 32 = -26$, Solution is: 3

64. $-5x - 3 = 22$, Solution is: -5

65. $-3t + 7 = 25$, Solution is: -6

66. $4x - 9 = -33$, Solution is: -6

67. $-17 = 15x - 2$, Solution is: -1

68. $6 = 17x + 23$, Solution is: -1

69. $x - 18 = -2x - 2$, Solution is: $\frac{16}{3}$

70. $-3r + 18 = r - 22$, Solution is: 10

71. $2x - 8 = -5x - 1$, Solution is: 1

72. $-5t + 4 = t - 18$, Solution is: $\frac{11}{3}$

73. $7(x - 3) = 2(x + 2)$, Solution is: 5

74. $5(x - 3) = 3(x - 1)$, Solution is: 6

75. $4 + 2(x + 7) = 3(x + 1) + 12$, Solution is: 3

76. $-3x - 9 = -4x - 3$, Solution is: 6

77. $6.1x - 5.1 = x + 2.9$, Solution is: $x = 1.568\,6$

78. $3(t + 6) = 8t - 17$, Solution is: 7

79. $2(x + 3) = -6x - 9$, Solution is: $-\frac{15}{8}$

80. $x - 2(x + 1) = -x + 3x$, Solution is: $-\frac{2}{3}$

81. $\frac{1}{2}x = 6$, Solution is: 12

82. $-5.1y - 8.7y = -9.2$, Solution is: $\{[y = 0.666\,67]\}$

83. $\frac{1}{2}t = 10$, Solution is: 20

84. $\frac{1}{3}x - 1 = 11$, Solution is: 36

85. $\frac{2}{3}t - \frac{1}{2}t = 7$, Solution is: 42

86. $\frac{3}{5}x - 4 = \frac{2}{3}x + 1$, Solution is: -75

87. $t + \frac{1}{2}t = 9$, Solution is: 6

88. $2x + \frac{2}{3}x = 24$, Solution is: 9

89. $9 - \frac{1}{2}x = \frac{3}{4}x + 4$, Solution is: 4

90. $\frac{x-3}{4} = 5$, Solution is: 23

91. $\frac{7-x}{3} = \frac{x+1}{5}$, Solution is: 4

92. $1 - \frac{2}{3}x = x - 9$, Solution is: 6

93. $7x - 2 + 3x = 9x + 5$, Solution is: 7

94. $0.3x - 1.7 = -5.1x + 1.8$, Solution is: $x = 0.648\,15$

95. $4 - \frac{7}{8}x = \frac{1}{2}x + 3\frac{5}{16}$, Solution is: $\frac{1}{2}$

96. $\frac{1}{7}x + \frac{2}{5} = \frac{4}{5}x - \frac{3}{7}$, Solution is: $\frac{29}{23}$

97. $\frac{1}{2}x - \frac{1}{4} = \frac{1}{8}x + \frac{1}{16}$, Solution is: $\frac{5}{6}$

98. $2.3x - 8.4 = -9.1 + 3.4x$, Solution is: $x = 0.636\,36$

99. $1.2 - 4.5x = 9.7x + 3.1$, Solution is: $x = -0.133\,8$

100. $0.6x - 4.0 = 0.67x + 1$, Solution is: $x = -71.\,429$

101. $4(2x - 1) = 12$, Solution is: 2

102. $3(x + 1) - 5 = 2x + (3x - 4)$, Solution is: 1

103. $2(3x + 1) - 5 = 4(x - 1) + x$, Solution is: -1

104. $3(x + 4) - 5(x - 2) = x$, Solution is: $\frac{22}{3}$

105. $4(t-2)-5(t+4) = 2t-8$, Solution is: $-\frac{20}{3}$

106. $-3(x+1)-2(4-x) = 2(x+5)-7$, Solution is: $-\frac{14}{3}$

107. $-2(4 - x) + 9x - 8 = 5(x - 4) - 7$, Solution is: $-\frac{11}{6}$

108. $8 = \frac{1}{2}x$, Solution is: 16

109. $\frac{2}{3}x = 14$, Solution is: 21

110. $33 = \frac{3}{4}x$, Solution is: 44

111. $45 = \frac{3}{5}x - 5$, Solution is: $\frac{250}{3}$

112. $2(\frac{1}{2}x - 4) = 3$, Solution is: 11

113. $\frac{1}{2}(x + 5) - x = 2$, Solution is: 1

114. $\frac{1}{3}(x - 2) = 11$, Solution is: 35

115. $\frac{1}{4}(x + 8) - 2 = 9$, Solution is: 36

116. $\frac{3}{4}(x - 12) = \frac{1}{2}$, Solution is: $\frac{38}{3}$

117. $\frac{7}{11}(x - \frac{1}{2}) = \frac{3}{4}x + 7$, Solution is: $-\frac{322}{5}$

Exercise Set

1. Many possible answers, all to the right of 7 on the number line.

2. Many possible answers, all to the right of 7 on the number line.

3. Many possible answers, all to the left of 7 on the number line.

4. Many possible answers, all to the left of 7 on the number line.

5. Many possible answers, all to the right of 2 on the number line.

6. Many possible answers, all to the right of 2 on the number line.

7. Many possible answers, all to the right of 2 on the number line.

8. Many possible answers, all to the left of 2 on the number line.

9. Many possible answers, all to the left of 2 on the number line.

10. Many possible answers, all to the left of 2 on the number line.

11. Many possible answers, all to the left of 2 on the number line.

12. .

(**a**) $2x-8 > 14$, Solution is: $(11, \infty)$

(**b**) $3t + 4 < 18$, Solution is: $\left(-\infty, \frac{14}{3}\right)$

(**c**) $2x - 32 \leq 66$, Solution is: $(-\infty, 49]$

(**d**) $5x - 3 \geq 22$, Solution is: $[5, \infty)$

(**e**) $2t + 7.1 < 19.4$, Solution is: $(-\infty, 6.15)$

(**f**) $4x - 9 < 38$, Solution is: $\left(-\infty, \frac{47}{4}\right)$

(**g**) $6x - 51 < 152$, Solution is: $\left(-\infty, \frac{203}{6}\right)$

(**h**) $164x + 6 < 170$, Solution is: $(-\infty, 1)$

(**i**) $x - 18 > 2x + 42$, Solution is: $(-\infty, -60)$

(**j**) $4r + 18 > r + 33$, Solution is: $(5, \infty)$

(**k**) $2x - 8 > -15$, Solution is: $\left(-\frac{7}{2}, \infty\right)$

(**l**) $3t + 4 > t + 1$, Solution is: $\left(-\frac{3}{2}, \infty\right)$

(**m**) $7x - 32 > x + 16$, Solution is: $(8, \infty)$

(**n**) $5x - 5.3 \leq 3x - 15.2$, Solution is: $(-\infty, -4.95]$

(**o**) $4x + 7.1 \leq 3x + 19.4$, Solution is: $(-\infty, 12.3)$

(**p**) $8x - 9 \leq 7x - 3$, Solution is: $(-\infty, 6]$

(**q**) $5.1x - 51 \leq 0$, Solution is: $(-\infty, 10)$

(**r**) $3t + 6 \leq 8t - 17$, Solution is: $\left[\frac{23}{5}, \infty\right)$

(**s**) $2(x + 3) > 6x$, Solution is: $\left(-\infty, \frac{3}{2}\right)$

(**t**) $x - 2(x + 1) < x + 7$, Solution is: $\left(-\frac{9}{2}, \infty\right)$

(**u**) $2x - 8 \leq -20$, Solution is: $(-\infty, -6]$

(**v**) $3t + 4 \geq -8$, Solution is: $[-4, \infty)$

(**w**) $2x - 32 \leq -26$, Solution is: $(-\infty, 3]$

(**x**) $-5x - 3 \geq 22$, Solution is: $(-\infty, -5]$

(**y**) $-3t + 7 \geq 25$, Solution is: $(-\infty, -6]$

(**z**) $4x - 9 \leq -33$, Solution is: $(-\infty, -6]$