

# Linear Equations - ANSWERS

## L1 Exercises

- |             |                             |                                 |                    |
|-------------|-----------------------------|---------------------------------|--------------------|
| 1. true     | 3. false                    | 5. true                         | 7. expression      |
| 9. equation | 11. linear                  | 13. not linear                  | 15. linear         |
| 17. yes     | 19. No                      | 21. $\frac{5}{6}$               | 23. $-2$           |
| 25. $-1$    | 27. $\mathbb{R}$ ; identity | 29. $\emptyset$ ; contradiction | 31. $-\frac{2}{3}$ |
| 33. $-6$    | 35. $\frac{13}{66}$         | 37. $-1$                        | 39. $-12$          |
| 41. 3       | 43. $\frac{5}{32}$          | 45. $\frac{145}{23}$            | 47. 2500           |


## L2 Exercise

- |  |                               |
|--|-------------------------------|
| 1. $A$ and $C$                                   | 3. $r = \frac{I}{Pt}$         |
| 5. $m = \frac{E}{c^2}$                           | 7. $b = 2A - a$               |
| 9. $l = \frac{P-2w}{2}$ or $l = \frac{P}{2} - w$ | 11. $\pi = \frac{S}{rs+r^2}$  |
| 13. $C = \frac{5}{9}(F - 32)$                    | 15. $p = 2Q + q$              |
| 17. $q = \frac{T-B}{Bt}$                         | 19. $R = \frac{d}{1-st}$      |
| 21. a. $C(n) = 1.9n + 3.2$                       | 23. a. 5 ml                   |
| b. \$22.20                                       | b. $d = \frac{c(a+12)}{a}$    |
| c. 15 km   | c. 75 mg                      |
| 25. a. $C = 1060d$                               | 27. $L = \frac{A}{W}$         |
| b. 7420  |                               |
| 29. a. $t = \frac{I}{Pr}$                        | 31. a. $k = 120$ ; $N = 120P$ |
| b. 3 year  | b. 75,778,800 bottles         |
| 33. 67 g   | 37. \$3000                    |
| 35. $\sim 5$ cm                                  | 41. $\sim 105$ barrels        |
| 39. The area would decrease by 25%               |                               |

### L3 Exercises

1.  $x - 7$
5.  $x^2 - y^2$
9.  $\frac{3x}{10}$
13.  $x^2 - x$
17. 238 and 239
21. 11, 13, 15
25. \$1850
29. \$9000 at 3%  
\$42000 at 6.5%
33. \$4800
37. 8 ft by 16 ft
41. 12 kg of pecans  
18 kg of cashews
45. 8.22 \$/kg
49. 375 ml
53. a. 1 hr 51 min; b. 1 hr 23 min
57. 1 min 12 sec
3.  $\frac{1}{2}(x + y)$
7.  $n + (n + 1) + (n + 2) = 30$
11.  $0.03x - 100$
15. 8
19. 86.9%
23. 33, 35, 37
27.  $\sim 158700$
31. \$6000 at 4.5%  
\$8000 at 5.25%
35.  $39^\circ, 63^\circ, 78^\circ$
39. 7 nickels; 9 dimes
43. 126 tickets for adults; 52 tickets for children
47. 20 grams
51. 40 ml
55. 6 km

### L4 Exercises

1.  $[2, 3]$
5.  $x > 3$   

9.  $[-5, \infty)$   

3.  $(-\infty, 4)$
7.  $-7 \leq x \leq 5$   

11.  $(-\infty, -2)$   


13.  $(-4, 1)$



17. yes

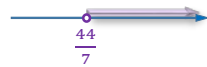
21.  $(-\infty, \frac{7}{3}]$



25.  $[-9, \infty)$



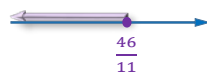
29.  $(\frac{44}{7}, \infty)$



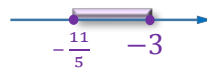
33.  $(-\infty, \frac{3}{2}]$



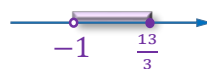
37.  $(-\infty, \frac{46}{11}]$



41.  $[-\frac{11}{3}, -3]$



45.  $(-1, \frac{13}{3}]$



49.  $3x + 2 \geq 8$   
 $x \in [2, \infty)$

53.  $-6 < 2x < 8$   
 $x \in (-3, 4)$

57. up to 112 days

61. more than \$30,000

15.  $(-5, -2]$



19. yes

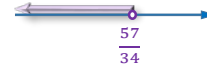
23.  $(15, \infty)$



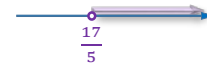
27.  $(-\infty, \infty) = \mathbb{R}$



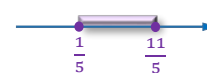
31.  $(-\infty, \frac{57}{34})$



35.  $(\frac{17}{5}, \infty)$



39.  $[\frac{1}{5}, \frac{11}{5}]$



43.  $(10, 14)$



47.  $x + 5 > 12$   
 $x \in (7, \infty)$

51.  $\frac{1}{2}(x + 3) \leq 12$   
 $x \in (-\infty, 21]$

55. at least 87%

59. between  $-5^\circ\text{C}$  and  $20^\circ\text{C}$ 

63. 65 cheques

## L5 Exercises

1.  $\{1, 3\}$

3.  $\{1, 3, 5\}$

5.  $\emptyset$

7.  $\{5\}$

9.  $[1, 3]$

11.  $(0, 7]$

13.  $(-\infty, \infty)$

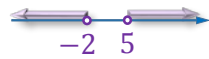
15.  $\{1\}$

17.  $(-2, \infty)$

19.  $(-\infty, -2) \cup (5, \infty)$

21.  $(-2, 1)$

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



25.  $[6, \infty)$

27.  $(\frac{14}{3}, \frac{22}{3}]$



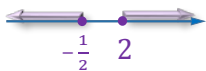
29.  $(-\infty, \infty) = \mathbb{R}$

31.  $(0, \infty)$



33.  $(-\infty, \frac{1}{2}) \cup [2, \infty)$

35.  $[-4, 7)$



37. 8.5 to 11.5 hr/day

39. at least 14 and at most 24

41. a. {Education, Humanities, Nursing, Veterinary Medicine}  
 b. {Nursing}  
 c. {Education, Humanities, Business, Mathematics, Dentistry, Veterinary Medicine}  
 d. {Business, Mathematics, Dentistry}

**L6 Exercises**

1.  $2x^2$

3.  $\frac{5}{|y|}$

5.  $7x^4|y|^3$

7.  $\frac{x^2}{|y|}$

9.  $\frac{x^2}{2}$

11.  $(x - 1)^2$

13. a.  $\emptyset$  b. 1 c. 2

15.  $\{-4, 4\}$

17.  $\{-5, 11\}$

19.  $\{0, \frac{10}{3}\}$

21.  $\{-28, 16\}$

23. no solution

25.  $\{-2, 2\}$

27.  $\{-7, 8\}$

29.  $\{-\frac{3}{5}, 5\}$

31.  $\{-\frac{40}{3}, -\frac{20}{7}\}$

33.  $\{\frac{20}{17}, \frac{40}{13}\}$

35.  $(-7, -1)$

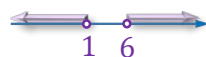
37.  $(-\infty, 7] \cup [17, \infty)$



39.  $[-\frac{11}{5}, 1]$



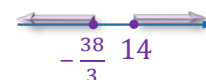
41.  $(-\infty, 1) \cup (6, \infty)$



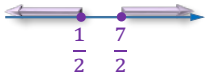
43.  $[-72, 120]$



45.  $(-\infty, -\frac{38}{3}] \cup [14, \infty)$



47.  $(-\infty, \frac{1}{2}] \cup [\frac{7}{2}, \infty)$



51.  $\{-6\}$

53.  $\emptyset$

57. a.  $|M - 370| \leq 50$

b.  $M \in [320, 420]$

61.  $|r - 85| \leq 25$

49.  $[-5, -3]$



55.  $\mathbb{R}$

59.  $|C - 1200| \leq 100$

$C \in [1100, 1300]$