

Chapter 2

Answers

Exercise 1 .

- | | | | | |
|--------|-------|--------|--------|-------|
| 1. 8 | 3. 0 | 5. -17 | 7. -18 | 9. 18 |
| 2. -15 | 4. 43 | 6. 3 | 8. 4 | 10. 7 |

Exercise 2 .

1. .

- | | | |
|-----------------|-----------------|---------------------------------------|
| (a) $8 > 2$ | (h) $12 > -431$ | (o) $-15 < 28$ |
| (b) $9 > 1$ | (i) $13 < 24$ | (p) $-7 < 16$ |
| (c) $3 < 4$ | (j) $7 < 16$ | (q) $17 \underline{\hspace{1cm}} - 4$ |
| (d) $3 > -1$ | (k) $-7 < -4$ | (r) $1800 > 999$ |
| (e) $14 > -24$ | (l) $18 > -999$ | (s) $-19 < 30$ |
| (f) $-4 > -8$ | (m) $13 > -24$ | (t) $20 > -8$ |
| (g) $-114 < 89$ | (n) $14 > -500$ | |

2. True or false?

- | | | |
|---------|---------|---------|
| (a) T | (d) T | (g) F |
| (b) T | (e) T | (h) F |
| (c) F | (f) F | (i) T |

(j) T	(n) F	(r) T
(k) F	(o) T	(s) T
(l) F	(p) T	(t) F
(m) T	(q) T	

Exercise 3 .

1. 8	4. 43	7. 4	10. 987
2. 15	5. 17	8. 30	11. $\frac{1}{2}$
3. 0	6. 3	9. 5000	12. 0.7

13. The negatives are:

14. 8	17. 43	20. -18	23. 7
15. -15	18. -17	21. 4	
16. 0	19. 3	22. 18	

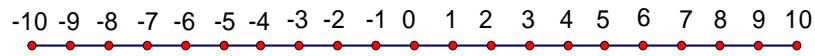
Exercise 4 .

1.

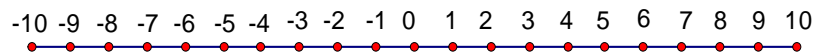
a) 6	f) -2	k) -5	p) 9
b) 8	g) -10	l) 11	q) 13
c) 1	h) -4	m) -23	r) -10
d) 15	i) -5	n) 9	s) 11
e) 3	j) -6	o) -13	t) 12
a) -10	f) -4	k) -23	p) -60
b) -5	g) -24	l) -7	q) 10
c) -11	h) -9	m) -16	r) 10
d) 3	i) -3	n) -9	s) 20
e) 19	j) 11	o) -53	t) 10

Exercise 5 Use motions on the number line to do each of the following additions.

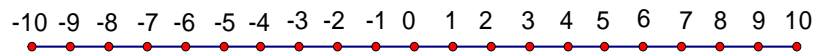
1. $-3 + 7 + (-4)$



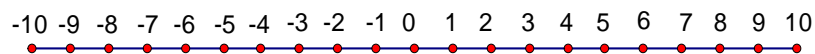
2. $5 + (-2) + 4 + (-1)$



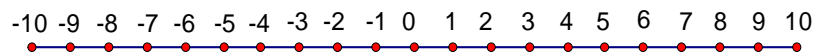
3. $4 + (-3) + 2 + (-1)$



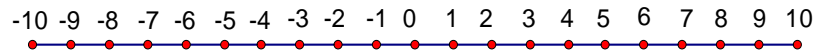
4. $-8 + 6 + (-7) + 5 + (-6) + 4$



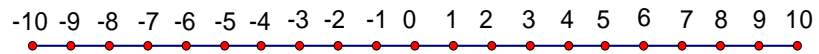
5. $5 + 4 + (-3) + (-1)$



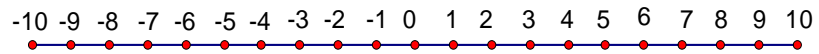
6. $-9 + 9 + (-4) + 4 + (-1)$



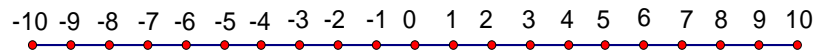
7. $-5 + 8 + (-2) + 4$



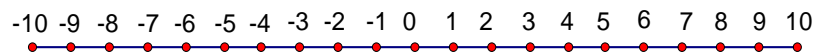
8. $-6 + 3 + 7 + (-9)$



9. $1 + (-1) + 1 + (-1) + 1 + (-1) + 5$



$2 + (-3) + 4 + (-7) + 5$



Exercise 6 .**1.**

0	14. -9	27. 76	40. -56
2. -2	15. 2	28. 0	41. -8
3. 1	16. -25	29. -15	42. 0
4. -3	17. -1	30. 4	43. 200
5. 14	18. 6	31. -29	44. -3
6. 82	19. -11	32. 4	45. 10
7. 73	20. -28	33. 24	46. -2
8. -7	21. 0	34. -9	47. 17
9. -5	22. -2	35. -2	48. -10
10. 93	23. -8	36. -15	49. -38
11. -19	24. -3	37. 0	50. 0
12. 5	25. 24	38. 0	
13. 14	26. 20	39. -6	

Exercise 7 .

1. 11	9. -3	17. -18	25. -13
2. 9	10. -1	18. -13	26. -2
3. 11	11. 15	19. -13	27. -5
4. 9	12. -11	20. -12	28. -7
5. 15	13. 16	21. 3	29. -49
6. -7	14. 17	22. -9	30. -38
7. -7	15. 23	23. -15	
8. -3	16. -9	24. 6	

Exercise 8 .

1.

12	9. 1	17. 9	25. 10
2. -5	10. 10	18. 19	26. -1
3. 10	11. 20	19. 1	27. 31
4. 16	12. -3	20. 14	28. -6
5. 10	13. 12	21. 2	29. 2
6. -9	14. 22	22. -1	30. 190
7. 86	15. 10	23. 24	
8. 17	16. -9	24. -11	

Exercise 9 .

1. -16	6. 27	11. -96	16. -12
2. 12	7. -42	12. 24	17. -8
3. 28	8. 18	13. 30	18. -36
4. 6	9. 50	14. 33	19. -1
5. -1	10. 20	15. -72	20. 1/3

Exercise 10 .

1. -4	6. 3	11. $-3/2$	16. 1
2. -24	7. -12	12. $1/6$	17. -2
3. 2	8. 9	13. $5/6$	18. -9
4. 6	9. 2	14. $1/4$	19. -1
5. -1	10. 5	15. $-9/8$	20. $1/3$

Exercise 11 .

1.

- | | | | |
|---------------|----------------|----------------|----------------|
| -10 | 9. -10 | 17. -14 | 25. -29 |
| 2. 1 | 10. 9 | 18. 47 | 26. 6 |
| 3. 16 | 11. 15 | 19. 8 | 27. 4 |
| 4. -8 | 12. -26 | 20. -34 | 28. -26 |
| 5. 2 | 13. 1 | 21. 5 | 29. 1 |
| 6. -14 | 14. 16 | 22. 44 | 30. -1 |
| 7. 31 | 15. -8 | 23. -35 | |
| 8. 4 | 16. -22 | 24. 45 | |

Exercise 12 .

1. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 91, 97

2. .

(a) 1, 2, 3, 4, 6, 12, 24

(b) 1, 2, 3, 5, 6, 10, 15, 30

(c) 1, 2, 5, 10, 25, 50

(d) 1, 2, 7, 14, 49, 98

(e) 1, 2, 4, 5, 8, 10, 20, 25, 40, 50, 100, 200

(f) 1, 2, 3, 4, 5, 6, 7, 10, 14, 15, 20, 21, 28, 30, 42, 60, 70, 84, 105, 140, 210, 420

3. .

(a) $24 = 1 \cdot 24 = 2 \cdot 12 = 3 \cdot 8 = 4 \cdot 6$

(b) $30 = 1 \cdot 30 = 2 \cdot 15 = 3 \cdot 10 = 5 \cdot 6$

(c) $50 = 1 \cdot 50 = 2 \cdot 25 = 5 \cdot 10$

(d) $98 = 1 \cdot 98 = 2 \cdot 49 = 7 \cdot 14$

(e) $200 = 1 \cdot 200 = 2 \cdot 100 = 4 \cdot 50 = 5 \cdot 40 = 8 \cdot 25 = 10 \cdot 20$

(f) $420 = 1 \cdot 420 = 2 \cdot 210 = 3 \cdot 140 = 4 \cdot 105 = 5 \cdot 84 = 6 \cdot 70 = 7 \cdot 60 =$
 $10 \cdot 42 = 14 \cdot 30 = 15 \cdot 28 = 20 \cdot 21$

4. .

(a)

$$2^3 \cdot 3$$

(b) $2 \cdot 3 \cdot 5$

(c) $2 \cdot 5^2$

(d) $2 \cdot 7^2$

(e) $2^3 \cdot 5^2$

(f) $2^2 \cdot 3 \cdot 5 \cdot 7$

Exercise 13 .

1. .

(a) $\frac{2}{3}$

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

(c) $\frac{1}{2}$

(d) $\frac{1}{2}$

(e) $\frac{8}{9}$

(f) $\frac{3}{16}$

(g) $\frac{10}{11}$

(h) $\frac{2}{3}$

(i) $\frac{5}{9}$

(j) $\frac{1}{2}$

(k) $\frac{1}{5}$

(l) $\frac{1}{7}$

2. .

(a) $\frac{4}{5}$

(b) $\frac{1}{2}$

(c) $\frac{7}{6}$

(d) $\frac{17}{12}$

(e) $\frac{11}{8}$

(f) $\frac{1}{8}$

(g) $\frac{7}{6}$

(h) $\frac{2}{5}$

(i) $\frac{1}{12}$

(j) $\frac{5}{112}$

(k) $\frac{2}{27}$

(l) $-\frac{1}{24}$

(m) $\frac{8}{5}$

(n) $\frac{27}{50}$

(o) 6

3. .

(a) 16

(b) 1

(c) $-\frac{1}{5}$

(d) $\frac{5}{4}$

(e) $-\frac{7}{6}$

(f) $-\frac{5}{12}$

(g) $-\frac{3}{8}$

(h) $-\frac{5}{16}$

(i) $\frac{7}{6}$

(j) $\frac{2}{5}$

(k) $\frac{1}{18}$

(l) 0

(m) $\frac{1}{12}$

(n) $\frac{1}{4}$

(o) $\frac{7}{12}$

4. .

(a) $\frac{-2}{5} = \frac{2}{-5} = -\frac{2}{5}$

(b) $\frac{-1}{8} = \frac{1}{-8} = -\frac{1}{8}$

(c) $\frac{3}{-7} = \frac{-3}{7} = -\frac{3}{7}$

(d) $\frac{9}{-2} = \frac{-9}{2} = -\frac{9}{2}$

(e) $-\frac{1}{4} = \frac{-1}{4} = \frac{1}{-4}$

(f) $-\frac{10}{11} = \frac{-10}{11} = \frac{10}{-11}$

5. .

(a) $\frac{3}{7}$

(b) $\frac{2}{5}$

(c) $\frac{1}{7}$

(d) $-\frac{2}{9}$ or $\frac{-2}{9}$

(e) $\frac{11}{19}$

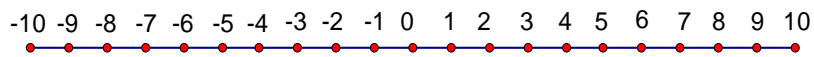
(f) $\frac{21}{35}$ or $\frac{3}{5}$

(g) $\frac{31}{7}$

(h) $-\frac{20}{11}$

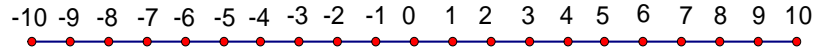
Exercise 14 .

1. Plot and label $-4\frac{1}{2}$, $-3\frac{1}{2}$, $-2\frac{1}{2}$, $-1\frac{1}{2}$, $-\frac{1}{2}$, $\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, $4\frac{1}{2}$ on the number line.



2. There are infinitely many answers, all between 1 and 2 on the number line.

3.



4. .

- (a) $\frac{1}{2} + \frac{1}{3} = \frac{1}{3} + \frac{1}{2}$ Commutative law for addition
- (b) $\left(\frac{1}{2} + \frac{1}{3}\right) + \frac{1}{4} = \frac{1}{2} + \left(\frac{1}{3} + \frac{1}{4}\right)$ Associative law for addition
- (c) $\frac{10}{21} \cdot \frac{-5}{3} = \frac{-5}{3} \cdot \frac{10}{21}$ Commutative law for multiplication
- (d) $\left(\frac{-1}{3} \cdot \frac{2}{5}\right) \cdot \frac{7}{11} = \frac{-1}{3} \cdot \left(\frac{2}{5} \cdot \frac{7}{11}\right)$ Associative law for multiplication
- (e) $\frac{5}{5} \cdot \frac{1}{3} = \frac{1}{3}$ Arithmetic and property of 1
- (f) $\left(\frac{2}{3} - \frac{2}{3}\right) \cdot \frac{8}{9} = 0$ Arithmetic and property of 0
- (g) $\frac{6}{7} \cdot \frac{8}{8} = \frac{6}{7}$ Arithmetic, property of 1
- (h) $\frac{6}{7} \left(\frac{3}{8} + \frac{-1}{4}\right) = \frac{6}{7} \cdot \frac{3}{8} + \frac{6}{7} \cdot \frac{-1}{4}$ Distributive law
- (i) $\frac{3}{8} + \frac{3}{11} + \frac{2}{5} = \frac{2}{5} + \frac{3}{8} + \frac{3}{11}$ Combination of commutative and associative laws for addition
- (j) $\frac{3}{8} \cdot \frac{-2}{9} + \frac{1}{7} \cdot \frac{3}{11} = \frac{3}{11} \cdot \frac{1}{7} + \frac{-2}{9} \cdot \frac{3}{8}$ Commutative law for addition and commutative law for multiplication)(twice)

5. .

- (a) $\frac{1}{2} + \frac{1}{3} = \frac{1}{3} + \frac{1}{2} = \frac{5}{6}$
- (b) $\left(\frac{1}{2} + \frac{1}{3}\right) + \frac{1}{4} = \frac{1}{2} + \left(\frac{1}{3} + \frac{1}{4}\right) = \frac{13}{12}$
- (c) $\frac{10}{21} \cdot \frac{-5}{3} = \frac{-5}{3} \cdot \frac{10}{21} = -\frac{50}{63}$

$$(d) \left(\frac{-1}{3} \cdot \frac{2}{5} \right) \cdot \frac{7}{11} = \frac{-1}{3} \cdot \left(\frac{2}{5} \cdot \frac{7}{11} \right) = -\frac{14}{165}$$

$$(e) \frac{5}{5} \cdot \frac{1}{3} = \frac{1}{3}$$

$$(f) \left(\frac{2}{3} - \frac{2}{3} \right) \cdot \frac{8}{9} = 0 \text{ (There was a typo in the text.)}$$

$$(g) \frac{6}{7} \cdot \frac{8}{8} = \frac{6}{7}$$

$$(h) \frac{6}{7} \left(\frac{3}{8} + \frac{-1}{4} \right) = \frac{6}{7} \cdot \frac{3}{8} + \frac{6}{7} \cdot \frac{-1}{4} = \frac{3}{28}$$

$$(i) \frac{3}{8} + \frac{3}{11} + \frac{2}{5} = \frac{2}{5} + \frac{3}{8} + \frac{3}{11} = \frac{461}{440}$$

$$(j) \frac{3}{8} \cdot \frac{-2}{9} + \frac{1}{7} \cdot \frac{3}{11} = \frac{3}{11} \cdot \frac{1}{7} + \frac{-2}{9} \cdot \frac{3}{8} = -\frac{41}{924}$$