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BLM 9–17

Chapter 9 *MathLinks 7*
Student Resource Answers

9.1 Explore Integer Addition, pages 313–315

5. a) (+5) + (–5) = 0 **b)** (–6) + (+4) = –2
c) (–4) + (+8) = +4
6. a) (+6) + (–9) = –3 **b)** (–4) + (+4) = 0
c) (+7) + (–3) = +4
7. a) +7 **b)** –6 **c)** +3 **d)** 0
8. a) –5 **b)** +8 **c)** –3 **d)** +5
9. a) $6 left **b)** 2 cm below
c) won by 3 goals **d)** 12 m under the water
10. –$15 **11.** –4°C
12. a) (+6) + (+2) = +8 **b)** (–5) + (+8) = +3
c) (+4) + (–4) = 0 **d)** (+6) + (–2) = +4
13. a)

(+2) + (+3) = +5	(+3) + (+2) = +5
(–1) + (–4) = –5	(–4) + (–1) = –5
(+2) + (–2) = 0	(–2) + (+2) = 0
(+4) + (–7) = –3	(–7) + (+4) = –3

b) The order in which you add 2 integers does not change the sum.
14. a) 5 red chips = +5; 7 red chips + 2 blue chips = (+7) + (–2) = +5; 10 red chips + 5 blue chips = (+10) + (–5) = +5
b) Answers will vary. For example: 4 blue chips; 6 blue chips and 2 red chips; 8 blue chips and 4 red chips
15. 0 **16.** –3
17. a) +6 **b)** –7 **c)** +1 **d)** –2 **e)** –11 **f)** 0
18. a) +4 **b)** No
19. a) The number of dots in each symbol on the turtle's back is equal to the number in the corresponding location of the magic square. The magic sum is 15.
b) –3 **c)** Yes, +3
d) Answers may vary. For example:

–8	+2	0
+6	–2	–10
–4	–6	+4

20. a) +3, 0, –1 **b)** +6, +3, +2, 0, –1, –2
c) +9, +6, +5, +3, +2, +1, 0, –1, –2, –3
d) Answers may vary.
e) Answers may vary.

9.2 Add Integers, pages 320–322

5. a) (+5) + (+4) = +9 **b)** (–4) + (+4) = 0
c) (+8) + (–9) = –1
6. a) (–6) + (–2) = –8 **b)** (+6) + (–4) = +2
c) (–1) + (+7) = +6
7. a) (+5) + (+5) = +10 **b)** (–3) + (–6) = –9
c) (+4) + (–10) = –6 **d)** (–7) + (+12) = +5
8. a) (–4) + (+8) = +4 **b)** (–4) + (–6) = –10
c) (+5) + (–9) = –4 **d)** (+10) + (–8) = +2
9. $8 **10.** –14°C
11. a) +7°C **b)** –20°C
12. a) –16 m **b)** –90 m
13. 0. The numbers are equal in value, but opposite in sign. They are opposites.
14. a) Answers may vary. For example: –2, +1, –3, +2, –4, +3, –5, +4
b) Yes. There is an infinite number of integers for which the sum of the 2 integers is –1.
15. a) (+9) + (–5) = +4
(+8) + (–4) = +4
(+7) + (–3) = +4
(+6) + (–2) = +4
b) The first integer decreases by 1 and the second integer increases by 1 from the top of the pattern to the bottom of the pattern.
c) (+5) + (–1) = +4
(+4) + (0) = +4
(+3) + (+1) = +4
16. –5, –4, –2, –1, 0, +1, +2, +3, +4, +5
17. a) +5; +4. As the value of the integer that is added to +6 decreases, the value of the integer answer decreases by 1.
b) (+2) + (+2) = +4
(+2) + (+1) = +3
(+2) + (0) = +2
(+2) + (–1) = +1
(+2) + (–2) = 0
(+2) + (–3) = –1
(+2) + (–4) = –2
c) (–3) + (+2) = –1
(–3) + (+1) = –2
(–3) + (0) = –3
(–3) + (–1) = –4
(–3) + (–2) = –5
(–3) + (–3) = –6
(–3) + (–4) = –7
(–3) + (–5) = –8
18. a) Never true. The sum of 2 negative integers is a negative integer.
(–5) + (–2) = –7
b) Sometimes true. The sum (+3) + (–2) = +1, but the sum (+3) + (–3) = 0.

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c) Always true. The sum (+5) + 0 = +5. When 0 is added to any integer, the value of the integer does not change.

d) Sometimes true. The sum (+3) + (–5) = –2, but the sum (+3) + (–3) = 0.

19. a) Answers may vary. For example: integer chips. Model the addition with 6 blue chips and 4 red chips. (–6) + (+4) = –2

b) Answers may vary. For example: a number line. The addition would involve too many chips to model with integer chips. (+90) + (–140) = –50

20. a) +14 **b)** –16 **c)** +2 **d)** –9

21. a) (+4) + (+5) = +9 **b)** (–6) + (+4) = –2 **c)** (–2) + (–5) = –7 **d)** +6 = (+9) + (–3) **e)** (+8) + (–6) = +2 **f)** –1 = (–5) + (+4)

22. a) –6 = (–1) + (–2) + (–3); –12 = (–3) + (–4) + (–5); –15 = (–4) + (–5) + (–6); +3 = 0 + (+1) + (+2); +6 = (+1) + (+2) + (+3)

b) Answers may vary. Any number that is the sum of 3 consecutive integers is a multiple of 3 or –3.

23. $28

9.3 Explore Integer Subtraction, pages 327–329

5. a) (+5) – (+3) = +2 **b)** (–7) – (–4) = –3

6. a) (–7) – (–1) = –6 **b)** (+6) – (+6) = 0

7. a) (–5) – (+1) = –6 **b)** (+5) – (+9) = –4

8. a) (+3) – (–4) = +7 **b)** (–4) – (–9) = +5

9. a) +2 **b)** +7 **c)** –12 **d)** +3

10. a) –4 **b)** +6 **c)** –11 **d)** –5

11. a) +2, –2 **b)** +4, –4 **c)** +4, –4 **d)** +2, –2

12. a) +4, –4 **b)** +5, –5 **c)** +4, –4 **d)** +2, –2

13. a) The difference of +12 h means that Perth, Australia is 12 h ahead of Bermuda; the difference of –12 h means that Bermuda is 12 h behind Perth, Australia.

b) The difference of +2 h means that Lima, Peru is 2 h ahead of Calgary, Alberta; the difference of –2 h means that Calgary, Alberta is 2 h behind Lima, Peru.

c) The difference of +11 h means that Lagos, Nigeria is 11 h ahead of Honolulu, Hawaii; the difference of –11 h means that Honolulu, Hawaii is 11 h behind Lagos, Nigeria.

d) The difference of +4 h means that Halifax, Nova Scotia is 4 h ahead of Dawson, Yukon Territory; the difference of –4 h means that Dawson, Yukon Territory is 4 h behind Halifax, Nova Scotia.

14. The difference of +6°C means that the afternoon temperature is 6°C above the morning temperature; the difference of –6°C means that the morning temperature is 6°C below the afternoon temperature.

15. a) 4 points **b)** 5°C **c)** $6

16. 15 floors down

17. Answers may vary. For example: The difference is the opposite of the original non–zero integer.

18. a)

(+3) – (+2) = +1	(+2) – (+3) = –1
(+4) – (–1) = +5	(–1) – (+4) = –5
(–3) – (+5) = –8	(+5) – (–3) = +8
(–2) – (–7) = +5	(–7) – (–2) = –5

b) Answers may vary. For example: The answers are opposites. The numerals are the same, but they are opposite in sign.

c) No. The order for this subtraction is given by the question. If the integers were subtracted in the other order, the answer would have the opposite sign.

19. a) +3 **b)** +1 **c)** 0 **d)** –5

20. a) +5 **b)** +5 **c)** +5 **d)** –4

21. a) $3\frac{1}{2}$ h behind **b)** $4\frac{1}{2}$ h ahead

9.4 Subtract Integers, pages 333–335

5. a) (+3) – (+4) = (+3) + (–4)

b) (–1) – (–10) = (–1) + (+10)

c) (–4) – (+5) = (–4) + (–5)

6. a) (–7) – (–6) = (–7) + (+6)

b) (+6) – (–3) = (+6) + (+3)

c) (–9) – (+9) = (–9) + (–9)

7. a) +6; (+2) – (–4) = (+2) + (+4) = +6

b) +4; (–3) – (–7) = (–3) + (+7) = +4

8. a) –10; (–4) – (+6) = (–4) + (–6) = –10

b) 0; (–8) – (–8) = (–8) + (+8) = 0

9. a) –6 **b)** +5 **c)** –13 **d)** +8

10. a) +10 **b)** –7 **c)** –4 **d)** +2

11. a) +2, –2 **b)** +2, –2 **c)** +5, –5

12. a) –2, +2 **b)** +6, –6 **c)** +1, –1

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13. Estimate: 1400 m; The difference of +1403 m means that Cypress Hills is 1403 higher in elevation than Lake Athabasca; the difference of –1403 m means that Lake Athabasca is 1403 m lower in elevation than Cypress Hills.
14. The difference of +108°C means that the temperature in Midale, Saskatchewan was 108°C higher than the temperature in Snag, Yukon Territory; the difference of –108°C means that the temperature in Snag, Yukon Territory was 108°C lower than the temperature in Midale, Saskatchewan.
15. The difference of +32 s means that the rocket launch at T minus 12 was 32 s faster than the rocket launch at T minus 44; the difference of –32 s means that the rocket launch at T minus 44 was 32 s slower than the rocket launch at T minus 12.
16. estimate: 600 m, calculate: 614 m
17. 396°C
18. +4, +5. As the integer that is subtracted decreases by 1, the integer that is the answer increases by 1.
19. a) (+1) – (–1) = +2
(+2) – (–2) = +4
(+3) – (–3) = +6
(+4) – (–4) = +8
b) Subtracting the opposite is the same as adding the first integer to itself.
c) +774
20. a) 7 units **b)** 9 units **c)** 9 units **d)** 5 units
21. P = 16 units, A = 16 square units
22. a) (+3) – (–2) = +5
(+2) – (–1) = +3
(+1) – (0) = +1
(0) – (+1) = –1
b) Answers may vary. The first integer is decreasing by 1. The integer that is subtracted is increasing by 1. The integer answer is decreasing by 2.
c) (–1) – (+2) = –3, (–2) – (+3) = –5, (–3) – (+4) = –7
23. a) (+8) – (+5) = +3 **b)** (–1) – (+4) = –5
c) (–2) – (–9) = +7 **d)** –6 = (–7) – (–1)
e) (+2) – (+2) = 0 **f)** –2 = (+5) – (+7)
24. +13, –3; (–3) – (+5) = –8; (+5) – (+13) = –8

9.5 Apply Integer Operations, pages 339–341

3. +30°C **4.** –5°C **5.** 10 203 m
6. –20 m; 20 m below the Fraser River
7. The wind speed decreased by 20 km/h.
8. a) loss of $4 million **b)** $20 million better
9. a) Add 3 to each preceding number; +13, +16, +19
b) Subtract 4 from each preceding number; –7, –11, –15
c) Add 2 to each preceding number; –3, –1, +1
d) Subtract 5 from each preceding number; 0, –5, –10
10. –11, –4; (–11) + (–4) = –15; –4 – (–11) = +7; (–11) – (–4) = –7
11. Answers may vary.
(+3) + 0 = +3 or (+3) – 0 = +3
(+4) + 0 = +4 or (+4) – 0 = +4
(+5) + 0 = +5 or (+3) – 0 = +5
(+6) + 0 = +6 or (+6) – 0 = +6
12. a) –2
b) 6 more strokes
c) Annika took 64 strokes to complete the first round. Michelle took 70 strokes to complete the first round.
13. a) +15 = (+7) + (+8), –9 = (–4) + (–5), –1 = 0 + (–1), –25 = (–12) + (–13)
b) All even integers **c)** +1, –1
14. a) –2 **b)** +1 **c)** –4
d) +10 **e)** 0 **f)** –11
15. Answers may vary.
16. a) 13 MPs **b)** 148 in favour and 147 against
17. a) 11 a.m. **b)** 5 p.m. Tuesday **c)** 6 h
18. a) 62 years **b)** 15 B.C.E. **c)** 18 C.E.

Chapter 9 Review, pages 342–343

1. –2 **2.** +1, –1
3. a) (+7) + (–4) = +3 **b)** (–6) + (+5) = –1
c) (+5) + (–8) = –3
4. a) (–5) + (–3) = –8 **b)** (+4) + (–4) = 0
c) (+6) + (–3) = +3 **d)** (–9) + (+4) = –5
5. The sum will be positive if the larger numeral is positive. (+5) + (–3) = +2. The sum will be negative if the larger numeral is negative. (–4) + (+3) = –1. The sum is zero if the integers are opposites.
6. (+4) + (–6) = (–2) The pelican dove 2 m below the surface of the water.

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7. a) (–4) + (–5) = –9 **b)** (+6) + (–3) = +3
8. a) (–3) + (+3) = 0 **b)** (+7) + (–2) = +5
c) (–4) + (+12) = +8 **d)** (+6) + (–8) = –2
9. Answers may vary. (–5) + (–4), (–6) + (–3), (–7) + (–2), (–8) + (–1)
10. 2 m below sea level
11. a) (–7) – (+2) = –9 **b)** (–4) – (–10) = +6
12. a) (–7) – (–5) = –2 **b)** (+4) – (–3) = +7
c) (+3) – (+8) = –5 **d)** (–1) – (+6) = –7
13. 15 h
14. a) –3; (+4) – (+7) = (+4) + (–7) = –3
b) –2; (–6) – (–4) = (–6) + (+4) = –2
15. a) –3 **b)** +2 **c)** –9 **d)** +13
16. The difference of +9259 m means that Mt. Everest is 9259 m higher in elevation than the Dead Sea; the difference of –9259 m means that the Dead Sea is 9259 m lower in elevation than Mt. Everest.
17. a) Add +6 to each preceding number. +27, +33, +39
b) Subtract 10 from each preceding number. 0, –10, –20
18. a) 7 strokes **b)** 2 strokes
c) 7 under par **d)** 281 strokes

Chapter 9 Practice Test, pages 344–345

1. D **2.** A **3.** B **4.** B **5.** C
6. D **7.** –4°C **8.** 17 units
9. a) –9 **b)** –5 **c)** –2
d) +12 **e)** –5 **f)** +5
10. a) (–6) + (+4) **b)** –2
11. P = 14 units, A = 12 square units
12. 281 m
13. +4, +12
14. a) No **b)** Yes, always positive
c) Yes, always negative **d)** No
15. a) Add 273 to the temperature in degrees Celsius to get the temperature in kelvins. Or subtract 273 from the temperature in kelvins to get the temperature in degrees Celsius.
b) –23°C **c)** 173 K