

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) $+7^\circ\text{C}$ 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) $(+2) + (+2) = +4$ c) $(-3) + (+2) = -1$
 $(+2) + (+1) = +3$ $(-3) + (+1) = -2$
 $(+2) + (0) = +2$ $(-3) + (0) = -3$
 $(+2) + (-1) = +1$ $(-3) + (-1) = -4$
 $(+2) + (-2) = 0$ $(-3) + (-2) = -5$
 $(+2) + (-3) = -1$ $(-3) + (-3) = -6$
 $(+2) + (-4) = -2$ $(-3) + (-4) = -7$
 $(-3) + (-5) = -8$
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 $(+3) + (-3) = 0$.

- 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 $+6^{\circ}\text{C}$ 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

- 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.

- 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