Applications

For Exercises 1–12, use your algorithms to find each sum without using a calculator.

1. $^{+}12 + {}^{+}4$

2. $^{+}12 + {}^{-}4$

3. $^{-}12 + {}^{+}4$

4. $^{-}7 + {}^{-}8$

5. $^{+}4.5 + {}^{-}3.8$

6. $^{-}4.5 + {}^{+}3.8$

7. $^{-}250 + {}^{-}750$

8. $^{-}6{,}200 + {}^{+}1{,}200$

9. $^{+}0.75 + {}^{-}0.25$

10. $^{+}\frac{2}{3} + {}^{-}\frac{1}{6}$

11. $^{-}\frac{5}{12} + {}^{+}\frac{2}{3}$

12. $^{-}\frac{8}{5} + {}^{-}\frac{3}{5}$

13. Find each sum.

a. $^{+}3.8 + {}^{+}2.7$

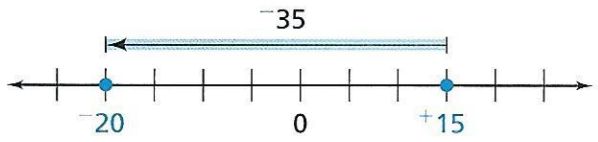
b. $^{-}3.8 + {}^{-}2.7$

c. $^{-}3.8 + {}^{+}2.7$

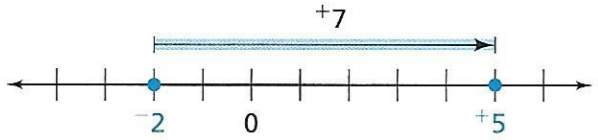
d. $^{+}3.8 + {}^{-}2.7$

14. Write an addition number sentence that matches each diagram.

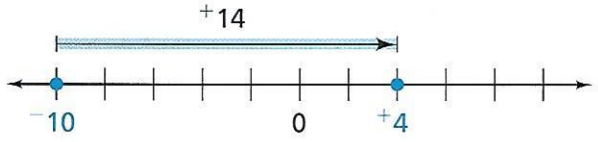
a.



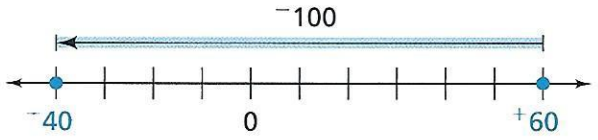
b.



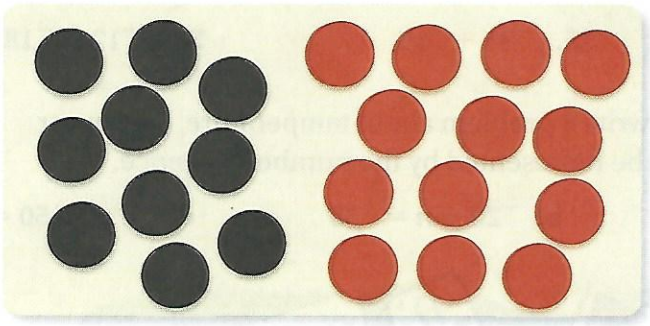
c.



d.



For Exercises 15 and 16, use the chip board below. The chip board has 10 black chips and 13 red chips.



15. What is the value shown on the board?

16. Write a number sentence to represent each situation. Then find the new value of the chip board.

a. Remove 5 red chips from the original board.

b. Then add 5 black chips.

c. Then add 4 black chips and 4 red chips.

17. Use properties of addition to find each value.

a. $^{+}43 + {}^{-}47 + {}^{-}43$ **b.** $^{+}5.2 + {}^{-}5.2 + {}^{-}\frac{4}{7}$ **c.** $^{+}5\frac{2}{5} + {}^{+}\frac{3}{7} + {}^{-}5\frac{2}{5}$

For Exercises 18–29, use your algorithms to find each difference without using a calculator. Show your work.

18. $^{+}12 - {}^{+}4$ **19.** $^{+}12 - {}^{+}12$ **20.** $^{-}12 - {}^{+}12$

21. $^{-}7 - {}^{+}8$ **22.** $^{+}45 - {}^{-}40$ **23.** $^{+}45 - {}^{-}50$

24. $^{-}25 - {}^{-}75$ **25.** $^{-}62 - {}^{-}12$ **26.** $^{+}0.8 - {}^{-}0.5$

27. $^{+}\frac{1}{2} - {}^{+}\frac{3}{4}$ **28.** $^{-}\frac{2}{5} - {}^{+}\frac{1}{5}$ **29.** $^{-}\frac{7}{10} - {}^{+}\frac{4}{5}$

30. Find each value without using a calculator.

a. $^{+}12 + {}^{-}12$ **b.** $^{+}4 - {}^{+}12$ **c.** $^{-}12 - {}^{+}4$

d. $^{-}12 - {}^{-}12$ **e.** $^{-}12 + {}^{-}12$ **f.** $^{-}12 + {}^{+}12$

For Exercises 31–36, find each value.

31. $^{+}50 + {}^{-}35$

32. $^{+}50 - {}^{-}20$

33. $^{-}19 - {}^{+}11$

34. $^{-}30 - {}^{+}50$

35. $^{-}35 + {}^{-}15$

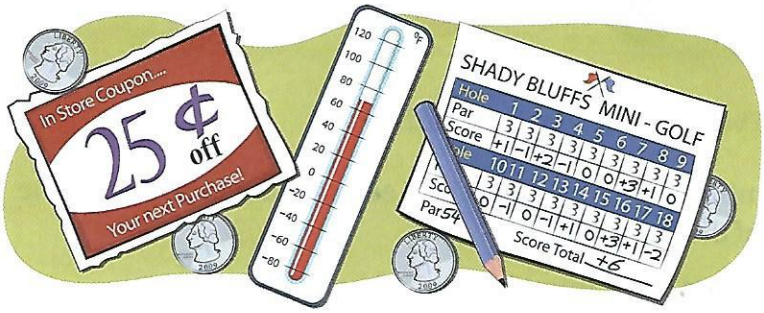
36. $^{+}12 + {}^{-}18$

37. For each part below, write a problem about temperature, money, or game scores that can be represented by the number sentence.

a. $^{+}7 - {}^{-}4 = {}^{+}11$

b. $^{-}20 + n = {}^{+}30$

c. $^{-}n + {}^{-}150 = {}^{-}450$



38. Without doing any calculations, decide which expression is greater. Explain your reasoning.

a. $5{,}280 + {}^{-}768$ or $5{,}280 - {}^{-}768$

b. $1{,}760 - {}^{-}880$ or $1{,}760 - 880$

c. $1{,}500 + 3{,}141$ or $1{,}500 - {}^{-}3{,}141$

39. Without doing any calculations, determine which of the following results are positive and which are negative. Explain your reasoning.

a. $^{-}23 + 19$

b. $3.5 - {}^{-}2.7$

c. $^{-}3.5 - {}^{-}2.04$

d. $3.1 + {}^{-}6.2$

40. Find each missing part.

	Start With	Rule	End With
a.	● ●	■	● ● ● ● ● ● ●
b.	● ● ●	■	● ● ●
c.	■	Add 5 ●	● ● ●
d.	■	Subtract 5 ●	● ●

For Exercises 41–46, find each sum or difference. Show your work.

41. $15 + {}^{-}10$

42. ${}^{-}20 - 14$

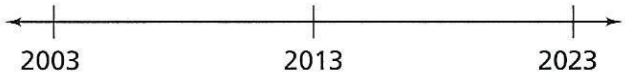
43. $200 - {}^{-}125$

44. ${}^{-}20 - {}^{-}14$

45. ${}^{-}200 + 125$

46. $7 - 12$

47. Below is part of a time line with three years marked.



a. Write two sentences in words that refer to the year 2013. One should relate 2013 to 2003, and the other should relate 2013 to 2023.

b. Write two number sentences that refer to the year 2013. One should relate 2013 to 2003, and the other should relate 2013 to 2023.

c. Describe how these two number sentences are alike and different.

48. Compute each of the following.

a. $3 + {}^{-}3 + {}^{-}7$

b. $3 - 3 - 7$

c. ${}^{-}10 + {}^{-}7 + {}^{-}28$

d. ${}^{-}10 - 7 - 28$

e. $7 - 8 + {}^{-}5$

f. $7 + {}^{-}8 - 5$

g. ${}^{-}97 + {}^{-}35 - 10$

h. ${}^{-}97 - 35 + {}^{-}10$

i. What can you conclude about the relationship between subtracting a positive number and adding a negative number with the same absolute value? In other words, what is the relationship between a $(- {}^{+})$ situation and a $(+ {}^{-})$ situation?

49. Compute each of the following.

a. $3 - {}^{-}3 - {}^{-}7$

b. $3 + 3 + 7$

c. ${}^{-}10 - {}^{-}7 - {}^{-}28$

d. ${}^{-}10 + 7 + 28$

e. $7 + 8 + 5$

f. $7 - {}^{-}8 - {}^{-}5$

g. ${}^{-}97 - {}^{-}35 - 10$

h. ${}^{-}97 + 35 + {}^{-}10$

i. What can you conclude about the relationship between subtracting a negative number and adding a positive number with the same absolute value? In other words, what is the relationship between a $(- {}^{-})$ situation and a $(+ {}^{+})$ situation?