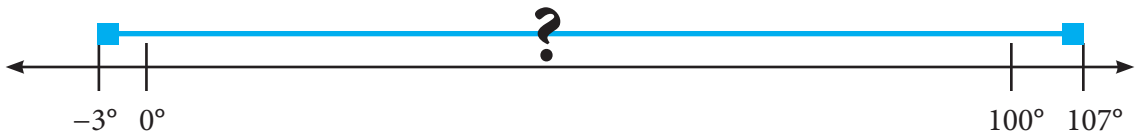
SUBTRACTING INTEGERS

LESSON 11

Subtract two integers to find the difference.

The record high temperature in Portland, Oregon is 107° F. The lowest temperature on record in Portland was −3° F. What is the difference between these temperatures?

$$107 - (-3) = ?$$



When subtracting integers, one method is to make the expression into an addition expression by adding the opposite. The difference in high and low temperatures in Oregon can be found by adding the opposite.

Change to addition — Change to its opposite

$$107 - (-3) = ?$$
$$107 + (+3) = 110° \text{ F}$$

The difference between the highest and lowest temperatures in Portland is 110° F.

SUBTRACTING INTEGERS

1. Subtract the integers by adding the opposite.
2. Follow the rules for adding integers to determine the sum.

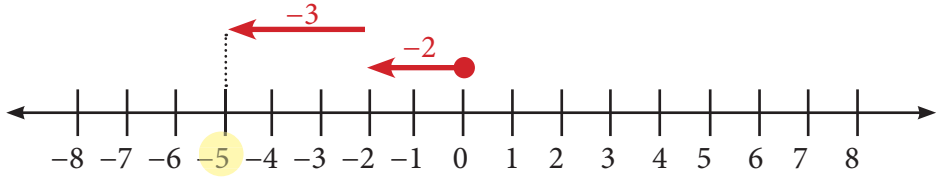
EXAMPLE 1

Use a number line to find the value of −2 − 3.

SOLUTION

−2 − 3 is −2 − (+3)

Add the opposite and use the number line to find the value. −2 + (−3) = −5

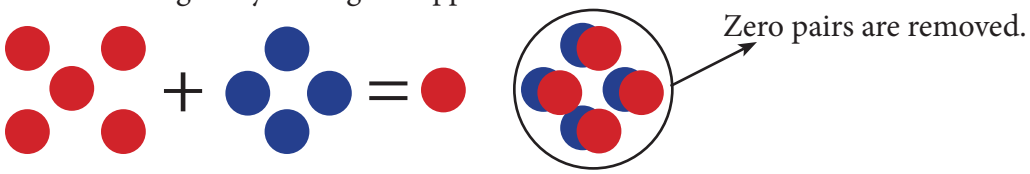


EXAMPLE 2

SOLUTION

Use integer chips to find the value of –5 – (–4).

Subtract the integers by adding the opposite: –5 + 4



–5 – (–4) = –1

EXAMPLE 3

SOLUTION

The melting point of mercury is approximately –39° C. The melting point of chlorine is approximately –101° C. How much higher is mercury's melting point than chlorine's melting point?

Subtract the melting point of chlorine from the melting point of mercury.

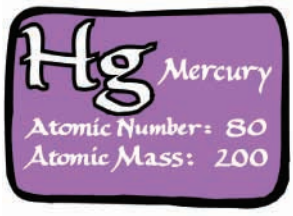
–39 –(–101)

Add the opposite. –39 + 101

Find the sign of the larger absolute value and then subtract.

101 – 39 = 62° C

Mercury's melting point is 62° C higher than chlorine's melting point.



EXERCISES

1. Explain how to change an integer subtraction expression into an integer addition expression. Give an example.

Use a number line to find each difference.

2. –4 – 2

3. 7 – (–1)

4. 5 – 4

5. 1 – 6

6. –3 – (–3)

7. 8 – (–2)

8. The current balance of Amber's bank account was $15. She withdrew $21. Find the new balance in her account.

Find each difference. Use integer chips, a number line or the integer subtraction and addition rules.

9. 8 – 2

10. 5 – (–3)

11. –9 – 4

12. –7 – 4

13. –9 – (–10)

14. 18 – (–2)

15. 40 – 15

16. 17 – 19

17. 6 – (–12)

18. –13 – 5

19. –3 – 10

20. –8 – (–8)

21. At 20,320 feet above sea level, Mount McKinley in Alaska is the highest point in the United States. The lowest point in the United States is in Death Valley, California. Death Valley is 282 feet below sea level. Write a subtraction expression to determine the difference in elevation between the highest and lowest points in the United States. Find the difference.

22. Write a subtraction expression that involves two negatives and has a positive answer.

Determine if each statement is always true, sometimes true or never true.

23. A positive number minus a positive number is a positive.

24. A negative number minus a negative number is a negative.

25. A negative number minus a positive number is a positive.

26. A positive number minus a negative number is a positive.

REVIEW

Find the value.

27. 4.1 + 5.08

28. 3(5.6)

29. 12.3 – 8.9

30. 6.4 ÷ 4

31. 7.28 + 3 + 6.8

32. 2.3(7.1)

Tic-Tac-Toe ~ Highs and Lows

Write a paper about the record high and low temperatures across the United States. Include the following in your paper:

Step 1: Predict which state(s) you believe might have the highest record temperature and which state(s) might have the lowest record temperature. Explain why you chose those states.

Step 2: Research the record high and low temperatures in at least 10 different states including Oregon. Create a table and record the state, the highest and lowest temperatures recorded in that state and the date each occurred.

Step 3: Find the range (largest minus smallest) between the highest and lowest temperature in each of the states in **Step 2**. Did your findings surprise you? Why or why not?