2-3 Subtracting Integers

Warm Up

Problem of the Day

Lesson Presentation

Warm Up

Add.

1. –2 + 6 4

2. –3 + (–4) –7

3. 7 + (–5) 2

4. 3 + (–4) –1

5. –6 + (–1) –7

6. –6 + 1 –5

Problem of the Day

Ray earned $172 shoveling walks and $188 babysitting. He spent $21 for a shovel and rock salt and $26 for toys for children. Which job was more profitable?

babysitting

2-3 Subtracting Integers

Learn to subtract integers.

2-3 Subtracting Integers

During its flight to and from Earth, the space shuttle may be exposed to temperatures as cold as –250°F and as hot as 3,000°F.

To find the differences in these temperatures, you need to know how to subtract integers with different signs.

You can model the difference between two integers by using a number line. When you subtract a positive number, the difference is *less* than the original number, so you move to the *left*. To subtract a negative number, move to the *right.*

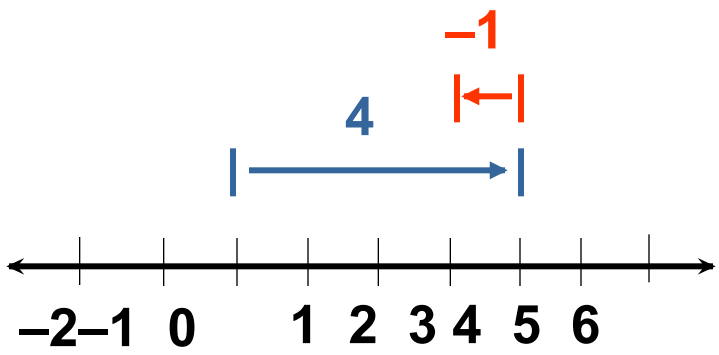
Helpful Hint

If the number being subtracted is less than the number it is being subtracted from, the answer will be positive. If the number being subtracted is greater, the answer will be negative.

Additional Example 1A: Modeling Integer Subtraction

Use a number line to find each difference.

4 – 1



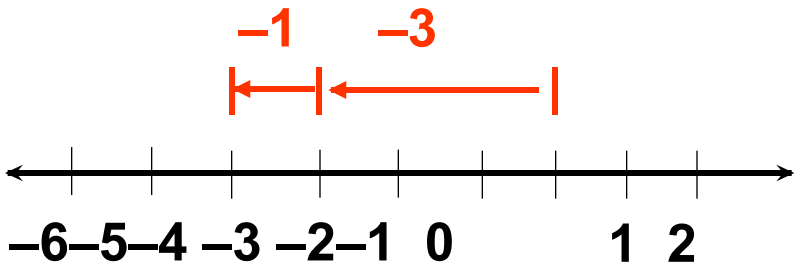
Start at 0. Move right 4 spaces. To subtract 1, move to the left.

$$4 - 1 = 3$$

Additional Example 1B: Modeling Integer Subtraction

Use a number line to find each difference.

–3 – 1



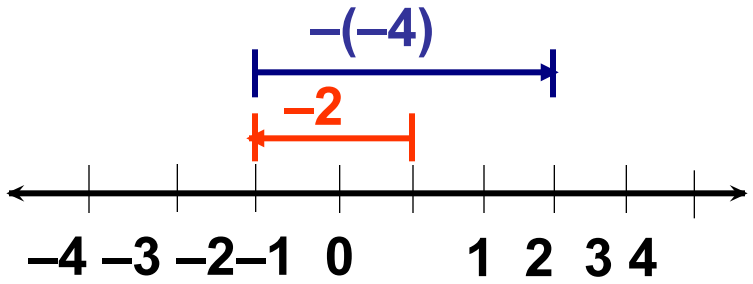
Start at 0. Move 3 spaces left. To subtract 1, move to the left.

$$-3 - 1 = -4$$

Additional Example 1C: Modeling Integer Subtraction

Use a number line to find each difference.

–2 – (–4)



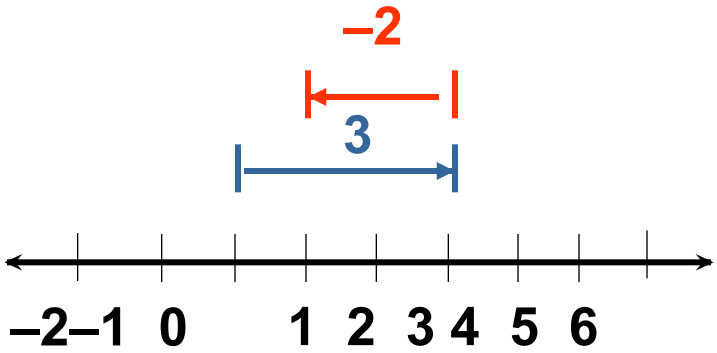
Start at 0. Move left 2 spaces. To subtract –4, move to the right.

$$-2 - (-4) = 2$$

Check It Out: Example 1A

Use a number line to find each difference.

3 – 2



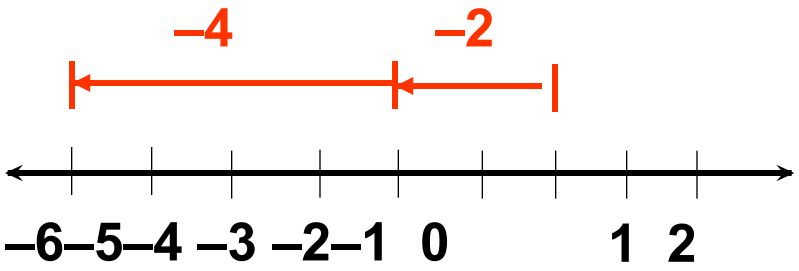
Start at 0. Move right 3 spaces. To subtract 2, move to the left.

3 – 2 = 1

Check It Out: Example 1B

Use a number line to find each difference.

–2 – 4



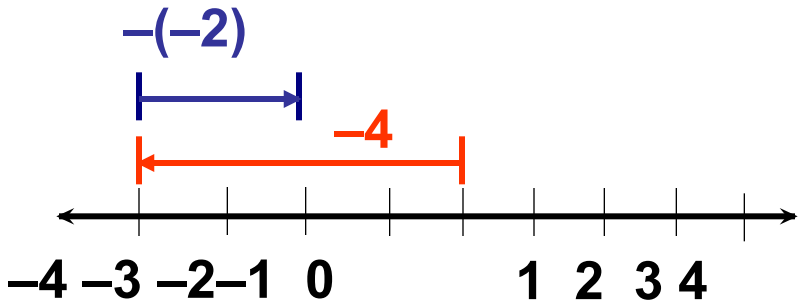
Start at 0. Move 2 spaces left. To subtract 4, move to the left.

$$-2 - 4 = -6$$

Check It Out: Example 1C

Use a number line to find each difference.

–4 – (–2)



Start at 0. Move left 4 spaces. To subtract –2, move to the right.

$$-4 - (-2) = -2$$

2-3 Subtracting Integers

Addition and subtraction are inverse operations—they "undo" each other. Instead of subtracting a number you can *add its opposite.*

Additional Example 2: Subtracting Integers by Adding the Opposite

Find each difference.

A. 5 – (–2)

5 + 2 — *Add the opposite of –2.*

7

B. –3 – 7

–3 + (–7) — *Add the opposite of 7.*

–10

C. – 1 – (–8)

–1 + 8 — *Add the opposite of –8.*

7

Check It Out: Example 2

Find each difference.

A. 4 – 2

$4 + (-2)$ *Add the opposite of 2.*

2

B. –2 – (–6)

$-2 + 6$ *Add the opposite of –6.*

4

C. –1 – 4

$-1 + (-4)$ *Add the opposite of 4.*

-5

Additional Example 3: Evaluating Expressions with Integers

Evaluate $x - y$ for each set of values.

A. $x = -3$ and $y = 2$

$x - y$

$-3 - 2 = -3 + (-2)$ *Substitute for x and y.*

$= -5$ *Add the opposite of 2.*

B. $x = 4$ and $y = -6$

$x - y$

$4 - (-6) = 4 + 6$ *Substitute for x and y.*

$= 10$ *Add the opposite –6.*

Check It Out: Example 3A & B

Evaluate $x - y$ for each set of values.

A. $x = -4$ and $y = -3$

$x - y$

$-4 - (-3) = -4 + 3$ *Substitute for x and y.*

$= -1$ *Add the opposite of –3.*

B. $x = -4$ and $y = 5$

$x - y$

$-4 - 5 = -4 + (-5)$ *Substitute for x and y.*

$= -9$ *Add the opposite of 5.*

Additional Example 4: *Temperature Application*

Find the difference between 32°F and –10°F.

32 – (–10)

32 + 10 = 42 *Add the opposite of –10.*

The difference in temperature is 42°F.

Check It Out: Example 4

Find the difference between 8°F and –5°F.

8 – (–5)

8 + 5 = 13 *Add the opposite of 5.*

The difference in temperature is 13°F.

Lesson Quiz: Part I

Use a number line to find the difference.

1. 3 – 9 –6

Find each difference.

2. –7 – 4 –11

3. –3 – (–5) 2

4. Evaluate $x - y + z$ for $x = -4$, $y = 5$, and $z = -10$. –19

Lesson Quiz: Part II

5. On January 1, 2002, the high temperature was 81˚F in Kona, Hawaii. The low temperature was –29˚F in Barrow, Alaska. What was the difference between the two temperatures?

110˚F