Add and Subtract Positive and Negative Integers

Name: _____

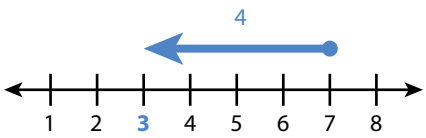
Prerequisite: Connect Addition and Subtraction

Study the example showing how to connect addition and subtraction. Then solve problems 1–9.

Example

Solve the subtraction problem: $7 - 4 = \square$.

To solve, you can represent $7 - 4 = \square$ using a number line. Start at 7 and move 4 units to the left to represent subtracting 4 from 7. You end at 3, so $7 - 4 = 3$.



Because addition and subtraction are inverse operations, you can also rewrite the subtraction problem as an addition problem. Think: "What number do I add to 4 to get 7?" Because $4 + 3 = 7$, you know $7 - 4 = 3$.

1 Draw a number line that represents $7 + (-4)$.

2 How does the number line you drew in problem 1 compare to the number line in the example?

_____

3 Use your answers to the last two problems to complete this equation.

$7 - 4 = 7 + $ _____

4 Complete each equation.

a. $-1 + (-4) =$ _____

b. $-1 -$ _____ $= -5$

c. $-1 + (-4) = -1 -$ _____

d. $1 - (-4) = 1 + 4 =$ _____

Solve.

5 The average low temperature for one winter day is 10°F. The low temperature on that day was actually −2°F.

a. Write a subtraction problem to represent the situation. Then write the subtraction problem as an addition problem.

b. Model the addition problem on a number line.

c. What is the difference in the temperatures?

6 Write an addition expression that is equivalent to $65 - 79$. Then evaluate the expression.

7 Explain how to write any subtraction problem as an addition problem. Why does it help to write a subtraction problem as an addition problem?

8 Write an absolute value expression to represent the distance between −1 and 6 on a number line. Then evaluate the expression.

9 The expression $x - 4$ represents a negative integer. What integers could x represent?

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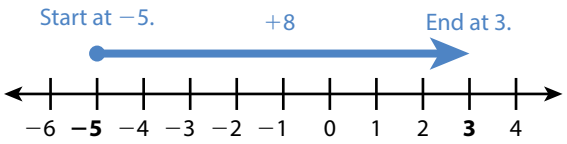
Addition Methods for Integers

Study the example problem showing how to add positive and negative integers. Then solve problems 1–7.

Example

At the end of the first round of a game, Luis has a score of −5 points. At the end of the second round, he has a score of 3 points. How many points did he score during the second round?

You can use a number line to help you understand the problem.



The number line shows that Luis scored 8 points during the second round.

1 Complete this model to represent the problem.

score at the end of first round + _____ = _____

2 Write an addition equation using numbers to represent the verbal equation in problem 1.

_____

3 Amy said she would have solved this problem differently. She saw that she was looking for the difference between the score in the second round, 3, and the score in the first round, −5, so she wrote the expression 3 − (−5). Does her method work? Explain.

_____

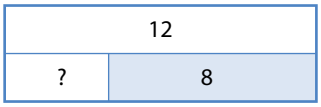
_____

Solve.

4 The temperature in Indianapolis was −4°F at 7:00 AM. The temperature rose 3°F by noon. What was the temperature at noon? Use a number line to find the answer.

5 Aiden had saved $22 before he earned $25 mowing a lawn. He then spent $32 on a suitcase. How much money does he have now? Explain how you found your answer.

6 Omar has a score of 12 in a bean-bag toss game. On his next turn he gets −8 points. Use the bar model to write an addition sentence that shows Omar's score now.



7 Gina works in a clothing store. At noon, she has $125 in the cash register. James gives her $60 for a sweater, and she gives him $7 change. Hana then gives her $40 for a blouse and receives $3 change. Use a series of addition equations to find out how much money Gina has in her cash register at the end of these sales.

Show your work.

Solution: _____

Name: _____

Subtraction Methods for Integers

Study the example showing how to subtract positive and negative integers. Then solve problems 1–4.

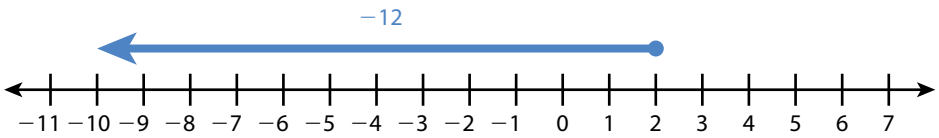
Example

Two friends are playing a game with a spinner that has positive and negative numbers on it. Each player takes turns spinning the spinner. The table shows the results of the first 4 rounds.

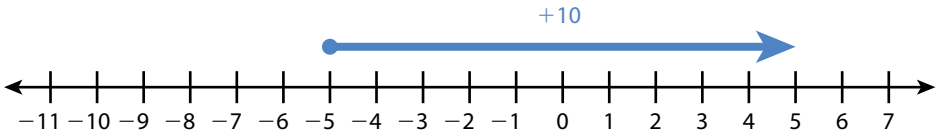
	Round 1	Round 2	Round 3	Round 4
Player 1	2	−5	−5	8
Player 2	12	−10	2	−4
Team Score				

The team score at the end of each round is found by subtracting Player 2's score from Player 1's score.

For Round 1: Subtracting 12 from 2 is the same as adding −12. Start at 2 and move left 12 units to arrive at −10.



For Round 2: Subtracting −10 is the same as adding 10. Start at −5 and move right 10 units to arrive at 5.



1 Use a number line to find the team score for Round 3.

Round 3 team score: _____

Solve.

2 Refer to the table from the previous page.

	Round 1	Round 2	Round 3	Round 4
Player 1	2	−5	−5	8
Player 2	12	−10	2	−4
Team Score				

On which round did the team get the highest score? Explain your answer.

3 Anita recorded the daily high and low temperatures as 13°F and −3°F, respectively.

a. Write the difference in temperatures, in °F, as a subtraction equation. Then write the difference in temperatures as an addition equation.

b. Give an example of a positive temperature and a negative temperature that have a difference of 5°F.

4 Consider the following problems.

a. Write a subtraction equation that involves one negative integer but results in a positive difference. Does the other integer have to be positive? Explain your answer.

b. Write a subtraction problem involving two positive integers with a negative difference. Explain the relationship between the two integers that must exist for the difference to be negative.

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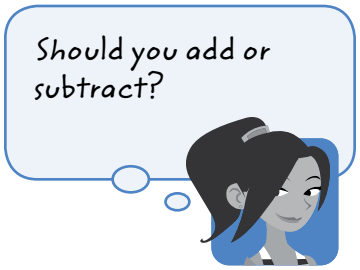
Add and Subtract Positive and Negative Integers

Solve the problems.

1 The element bromine turns into a liquid at −7°C, and it turns into a gas at 59°C. From the temperature at which bromine becomes a liquid, by how many degrees must the temperature change for it to turn into a gas?



A −66°C

B −52°C

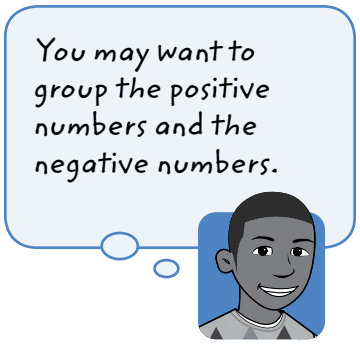
C 52°C

D 66°C

Johnathan chose **C** as his answer. How did he get that answer?

_____

2 Lamont keeps track of his math grades by recording them in a table. He wants to keep an average of 90, so he also lists the amount that each grade is above or below 90.



a. Complete the table.

Test	1	2	3	4	5	6
Grade	83	94	79		96	
Above/Below 90	−7	4		7		−3

b. Use the numbers in the *Above/Below 90* row to find out whether Lamont's average is above or below 90.

Show your work.

_____

_____

Solution: _____

c. What grade does Lamont need to get on the next test to have an average of exactly 90? Explain your answer.

_____

_____

Solve.

3 Which expressions are equivalent to -9? Select all that are correct.

A $8 - 8 + 9$

B $3 - (-6) + (-18)$

C $-1 + 7 - (-3)$

D $4 - 5 - 8$

Recall how to write a subtraction problem as an addition problem.

4 Tell whether each equation is *True* or *False*.

a.	$-4 + (-7) = 11$	☐ True	☐ False
b.	$5 + (-4) = -5 + 4$	☐ True	☐ False
c.	$-10 + 7 = 7 - 10$	☐ True	☐ False
d.	$14 + (-3) = 10 + 1$	☐ True	☐ False

What should be your first step?

5 A duck is sitting on a ledge that is 11 feet above the surface of a pond. The duck dives 27 feet straight down to get food at the bottom of the pond. Which expression represents the position of the bottom of the pond, in feet, relative to its surface level?

A $27 + 11$

B $27 + (-11)$

C $11 - (-27)$

D $11 + (-27)$

What does a negative value mean in this situation?

6 Which of the following are negative integers? Select all that are correct.

A the sum of two positive integers

B the sum of two negative integers

C the difference of a positive integer and an integer that is greater than it

D the difference of a negative integer and an integer that is greater than it but that is not its opposite

You may want to draw a number line and try sample numbers.