

WORDS TO KNOW

place value

addend

Lesson 8

ADD AND SUBTRACT DECIMALS NY-6.NS.3

INTRODUCTION

Real-World Connection

At the school's store, Lexi wants to buy a lanyard for \$5.45, a backpack for \$18.99, and a T-shirt for \$14.00. What is the total cost for Lexi to buy all three of these items? Let's practice the skills in the **Guided Instruction** and **Independent Practice** and, at the end of the lesson, see how much Lexi will need to spend!



What I Am Going to Learn

- How to add and subtract decimals using the standard algorithm
- How to solve problems involving decimal addition and subtraction

What I May Already Know

- I know how to add and subtract decimals to the hundredths place.

Vocabulary in Action

Decimals are added and subtracted in the same way as whole numbers.

- Any place-value category is 10 times the amount of the place to the right, so regrouping works the same as with whole numbers.
- The decimal point sets the **place value** for each digit, separating the whole-number part from the decimal part.
- The decimal points should be lined up when stacking numbers, so that the same place value is added or subtracted.

line up decimals
↓
7.143
+ 12.280 ← write zero(s) as
 placeholders

- Like whole numbers, when decimals are added, they are called **addends**.

EXAMPLE

Find the sum: $8.26 + 13.9$

Step One Write the numbers vertically, lining up the decimal points, and therefore the place-value categories.

Step Two Add a zero placeholder in the hundredths place of 13.9.

Step Three Add from right to left, as with whole numbers.

- The hundredths add to 6.
- The tenths add to 11, or 1 one and 1 tenth.
- The ones add to 12, or 1 ten and 2 ones.
- The tens add to 2.

$$\begin{array}{r} 11 \\ 8.26 \\ + 13.90 \\ \hline 22.16 \end{array}$$

Step Four Remember to place a decimal in the sum, in line with the decimal in the addends.

$$8.26 + 13.9 = 22.16$$

EXAMPLE

Find the difference: $9 - 2.76$

Step One Write the numbers vertically, lining up the decimal points.

9 does not show a decimal point, so write the point after the digit. Write zeros as placeholders.

$$\begin{array}{r} 9.00 \\ - 2.76 \\ \hline \end{array}$$

Step Two Subtract from right to left, as with whole numbers.

Both 6 and 7 are greater than 0, so regroup.

- The hundredths subtract to 4.
- The tenths subtract to 2.
- The ones subtract to 6.

$$\begin{array}{r} 8 \ 9 \ 1 \\ \cancel{9}.\cancel{0}0 \\ - 2.76 \\ \hline 6.24 \end{array}$$

So, $9 - 2.76 = 6.24$.

Step Three Check your answer by adding: $6.24 + 2.76 = 9$.

GUIDED INSTRUCTION

1. If Ingrid needs to walk 3.4 km to school, and then 2.95 km to the library, how far does she walk in all?

Step One Line up the decimal points.

Write 0 as a placeholder.

$$\begin{array}{r} 3.40 \\ + 2.95 \\ \hline \end{array}$$

Step Two Add the hundredths.

$$\begin{array}{r} 3.40 \\ + 2.95 \\ \hline 5 \end{array}$$

Step Three Add the tenths.

Regroup 13 tenths as 1 and 3 tenths.

$$\begin{array}{r} 1 \\ 3.40 \\ + 2.95 \\ \hline 35 \end{array}$$

Step Four Add the ones.

Place the decimal point in the answer.

$$\begin{array}{r} 1 \\ 3.40 \\ + 2.95 \\ \hline 6.35 \end{array}$$

The sum of 3.4 and 2.95 is 6.35.

2. Find the difference of 8.5 and 2.76.

Step One Line up the decimal points.

Write 0 as a placeholder.

$$\begin{array}{r} 8.50 \\ - 2.76 \\ \hline \end{array}$$

TIPS AND HINTS

Many decimal problems can be solved mentally since totals are often 10 or 100. 2.95 is 0.05 from 3, $3 + 3.4 = 6.40$, $6.40 - 0.05 = 6.35$.



Step Two $6 > 0$, so regroup.

Subtract the hundredths.

$$\begin{array}{r} 41 \\ 8.50 \\ - 2.76 \\ \hline 4 \end{array}$$

Step Three $7 > 4$, so regroup.

Subtract the tenths.

$$\begin{array}{r} 7141 \\ 8.50 \\ - 2.76 \\ \hline 74 \end{array}$$

Step Four Subtract the ones.

Place the decimal point in the answer.

$$\begin{array}{r} 7141 \\ 8.50 \\ - 2.76 \\ \hline 5.74 \end{array}$$

The difference between 8.5 and 2.76 is .

TIPS AND HINTS

It might be helpful to think of decimals as money.

$\$8.50 - \$2.75 = \$5.75$, but $\$2.76$ is 1¢ more than $\$2.75$, so the total is 1¢ less than $\$5.75$, or $\$5.74$.

3. Which expression has either a sum or difference of 14.55?

- (A) $51 - 36.45$
 (B) $111.07 - 82.52$
 (C) $3.45 + 11.05$
 (D) $25.79 - 10.24$

TIPS AND HINTS

Try adding or subtracting just the decimal places. If the sum or difference does not end in 0.55, then you know that answer is not correct.

4. Luigi adds 3.4 and 0.56 and gets a total of 9. How can you tell that Luigi's answer is incorrect? What do you think his mistake was?

Learning Together

Working with a partner, write the answers to these sentences.

- When adding and subtracting decimals, it is helpful to write the numbers in a vertical stack because . . .
- When adding and subtracting decimals, the location where you might add one or more zeros is . . .
- It is helpful to add zero as a placeholder because . . .
- When adding and subtracting decimals, the location of the decimal in the answer is . . .
- In value, the digits to the right of a decimal point, are . . .



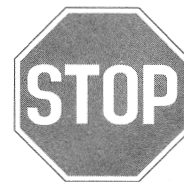
How Am I Doing?

What questions do you have?

How do you add and subtract decimal numbers?

What is an example of a situation where you would add or subtract decimals?

Circle the sign that shows how you are doing with the skill.



I am stuck.



I almost have it.



I understand the skill.

INDEPENDENT PRACTICE 1

1 Which value will make the equation true?

$$77.18 + 61.86 = \underline{\quad}$$

- A 138.94
- B 139.04
- C 1,390.4
- D 1,390.9

2 Clark and his father went fishing. Clark caught a bass that weighed 3.256 pounds, and his father caught a bass that weighed 1.9 pounds. Which is the total weight, in pounds, of the fish they caught?

- A 1.356
- B 4.156
- C 4.265
- D 5.156

3 Helen had \$345.67 in her bank account. Last month, she made a deposit of \$76.45 and a withdrawal of \$125.50. How much was in her bank account at the end of the month?

- A \$220.17
- B \$296.62
- C \$394.72
- D \$447.62

◀ TIPS AND HINTS

When checking answer choices, start at the smallest place value. Do the hundredths add to a number that ends in 4 or 9?

◀ THINK ABOUT IT

Why is it a good practice to add zero as a placeholder when adding and subtracting numbers with different place-value categories?

◀ THINK ABOUT IT

Why is it usually easy to keep the decimals aligned when adding and subtracting money?

4

Talon is purchasing a bicycle. The cost information is shown below.

- The regular price of a bicycle is \$123.59.
- The bicycle is on sale for \$96.72.

How much can Talon save by buying the bicycle on sale?

Show your work.

SKETCH IT

Using rectangles for bills and circles for coins, sketch the regular price of the bike using this breakdown: five \$20s, three \$5s, and seven \$1s, five quarters, two dimes, two nickels, and four pennies. Then circle the sale price.

Answer \$ _____



INDEPENDENT PRACTICE 2

1 Which of these addition expressions has a sum of 74.84?

A $12.97 + 61.85$

C $60 + 14.94$

B $65 + 9.84$

D $39.67 + 35.07$

2 Which of the following subtraction expressions has a difference equal to 22.17?

A $42.07 - 19.09$

C $42.07 - 19.9$

B $30.46 - 7.35$

D $714.98 - 692.71$

3 The table below shows the times, in minutes, of the results of a race.

RACE RESULTS

Runner	Time (minutes)
Abby	5.65
Brad	7.1
Cade	6.07
Dale	6.44

How much faster, in minutes, was Abby than Dale?

A 0.79

C 1.45

B 0.89

D 8

4 Heena planted a seedling that had a height of 9.3 centimeters. When she measured it three weeks later, its height was 26.2 centimeters. How many centimeters did the plant grow in those three weeks?

A 16.9

C 27.9

B 23.1

D 35.5

5 Shondra buys two bags of sugar. Each bag contains 1.8 kilograms of sugar. However, one of the bags is torn, and 0.4 kilogram of sugar leaks out as Shondra returns home. How many kilograms of sugar did Shondra have when she arrived home?

- A 1.4
- B 3.2
- C 4.5
- D 9

6 A student is testing the effect of different waters on plant growth. Plant A is 13.45 inches tall. Plant B is 1.2 inches taller than Plant A. Plant C is 2.1 inches shorter than Plant B. Which plant is the shortest, and how tall is that plant?

- A Plant A; 13.45 inches tall
- B Plant B; 14.65 inches tall
- C Plant C; 12.55 inches tall
- D Plants A and C are the same height; 13.45 inches

7 Look at the three numbers below.

4.567 5.2 12.53

If you are adding these three numbers and line them up on the right instead of lining the decimals up, which statement **best** describes one of the problems you will have?

- A Your answer will be off by a factor of 10.
- B Your answer will be off by a factor of 100.
- C It will be unclear where the decimal goes.
- D The answer numbers will be right, but the decimal placement will be wrong.

8

Study the subtraction problem below.

$$\begin{array}{r} 72 \\ - 25.6 \\ \hline \end{array} \longrightarrow \begin{array}{r} 72. \\ - 25.6 \\ \hline 47.6 \end{array}$$

What was done correctly and incorrectly to solve the subtraction problem?

Explain your answer.

9

What is the value of $\$8.00 - \5.67 ?

Show your work.

Answer \$ _____

How you can check that your answer is correct?

Explain your answer.

EXIT TICKET

NY-6.NS.3

Now that you have mastered adding and subtracting decimals, let's solve the problem in the **Real-World Connection**.

At the school store, Lexi wants to buy a lanyard for \$5.45, a backpack for \$18.99, and a T-shirt for \$14.00. What is the total cost for Lexi to buy all three of these items?

Use mental math and then the algorithm.