ADDING AND SUBTRACTING DECIMALS

LESSON 1.6

Find sums or differences of expressions involving decimals.

Laura walked on Friday and Saturday. She wants to keep track of her total meters walked. She needs to add the distances she walked each day together.

Adding or Subtracting Decimals

1. Line up the decimal points.
2. Insert zeros so each decimal has the same amount of places after the decimal point.
3. Add or subtract.
4. Move the decimal point down into the answer in its same position.

EXAMPLE 1

Laura walked 1,609.344 meters on Friday and 1,207.008 meters on Saturday. How many meters did she walk altogether?

Solution

Write the problem. 1609.344 + 1207.008

Line up the decimal points.

$$\begin{array}{r} 1609.344 \\ +\ 1207.008 \end{array}$$

Add.

$$\begin{array}{r} {\scriptstyle 1\quad 1} \\ 1609.344 \\ +\ 1207.008 \\ \hline 2816.352 \end{array}$$

Laura walked 2,816.352 meters altogether.

EXAMPLE 2

Laura walked 1,628.3 meters on Sunday and 1,207.25 meters on Monday. How many more meters did Laura walk on Sunday than on Monday?

Solution

Write the problem. 1628.3 − 1207.25

Line up the decimal points.

$$\begin{array}{r} 1628.3 \\ -\ 1207.25 \end{array}$$

Insert zeros.

$$\begin{array}{r} 1628.30 \\ -\ 1207.25 \end{array}$$

Zeros can be added at the end of a decimal without changing the value of the number.

Subtract.

$$\begin{array}{r} {\scriptstyle 2\ 10} \\ 1628.\cancel{3}0 \\ -\ 1207.25 \\ \hline 421.05 \end{array}$$

On Sunday, Laura walked 421.05 meters more than on Monday.

EXPLORE! FIT OCCUPATIONS

Many Americans are not exercising enough according to a study published in 2007 by the American Council of Exercise. The table below shows the results from a study documenting how many steps (and the conversion of steps to miles) were taken by people in different occupations.

The average total distance in miles is shown in the last column. For example, the secretaries in this study walked, on average, 1.7 ± 0.66 miles each day. This means:

Shortest Distance	Longest Distance
1.7 − 0.66	1.7 + 0.66
$\overset{6\ 10}{1.\cancel{7}0}$ − 0.66 1.04	$\overset{1}{1}.70$ + 0.66 2.36

Use the table to answer the following questions.

Table 1. Average steps and distance walked by people in different occupations over the course of an average working day.

Occupation	Total Steps	Total Distance (mi)
Secretaries	4,327 ± 1,671	1.7 ± 0.66
Teachers	4,726 ± 1,832	1.9 ± 0.73
Lawyers	5,062 ± 1,837	2.0 ± 0.73
Police officers	5,336 ± 1,767	2.1 ± 0.70
Nurses	8,648 ± 2,461	3.4 ± 0.98[a]
Construction workers	9,646 ± 2,719	3.8 ± 1.08[a]
Factory workers	9,892 ± 2,496	3.9 ± 0.99[a]
Restaurant servers	10,087 ± 2,908	4.0 ± 1.15[a]
Custodians	12,991 ± 4,902	5.2 ± 1.94[a,b]
Mail carriers	18,904 ± 5,624	7.5 ± 2.23[a,b,c]

[a]Significantly different than secretaries, teachers, lawyers and police officers ($p < 0.05$).

[b]Significantly different than nurses, construction workers, factory workers and restaurant servers ($p < 0.05$).

[c]Significantly different than all other occupations ($p < 0.05$).

Source: http://www.acefitness.org/getfit/studies/10kStudy2007.pdf

Step 1: What was the longest average total distance walked each day by:

a. nurses?

b. restaurant servers?

c. mail carriers?

Step 2: What was the shortest average total distance walked each day by:

a. construction workers?

b. lawyers?

c. mail carriers?

Step 3: Use the first number of each expression in the total distance column to determine how much further, on average, _____ walked each day than _____ .

a. mail carriers, secretaries

b. construction workers, teachers

c. restaurant servers, police officers

Example: custodians and nurses

Custodians' 1st number: 5.2 ± 1.94

Nurses' 1st number: 3.4 ± 0.98

$\overset{4\ 12}{5.\cancel{2}}$
− 3.4
1.8

Custodians walked, on average, 1.8 miles more than nurses.

EXERCISES

Find each sum.

1. 2.1 + 3.4

2. 4.32 + 5.29

3. 3.786 + 9.42

4. 4.607 + 3.4

5. 1.325 + 5.78

6. 53.999 + 32.187

7. Monica spent $15.17 on a pair of pants and $4.96 on a pair of socks. How much did she spend altogether?

Find each difference.

8. 7.2 – 2.5

9. 4.31 – 1.75

10. 8.241 – 6.456

11. 12.1 – 9.24

12. 6.087 – 3.43

13. 15.55 – 11.901

14. Chan filled his car with 12.85 gallons of gas one week. The next week he filled his car with 9.08 gallons. How many more gallons of gas did he put in his car the first week than the second week?

The table at the right shows the monthly rainfall in Ocean View. Use the table to answer each question. Show all work necessary to justify your answer.

Month	Rainfall (inches)
January	8.07
February	2.85
March	6.22
April	5.02
May	5.86
June	3.31
July	1
August	0.03
September	2.72
October	5.59
November	8.44
December	15.58

15. How many inches of rain fell in Ocean View in September and October altogether?

16. How many more inches of rainfall did Ocean View have in November than in October?

17. How many more inches of rainfall did Ocean View have in December than in March?

18. How many inches of rainfall did Ocean View have in May and June altogether?

19. How many total inches of rainfall did Ocean View accumulate in February, March and April?

20. How many total inches of rainfall did Ocean View have in the last two months of the year?

21. What was the total rainfall in Ocean View during the first two months of the year?

22. Describe the similarities and differences between adding 23 and 45 and adding 0.23 and 0.45.

23. Nachelle had $271.74 in her bank account. She made two withdrawals. One was for $52.49 and the other was for $14.88. How much money did she have left in her bank account?

REVIEW

24. Write a decimal that is between 1.5 and 2.

25. Write a decimal that is greater than 3.4 but less than 3.5.

26. Write a decimal that is less than 5.056 but greater than 5.05.

27. Round 4.678 to the nearest hundredth.

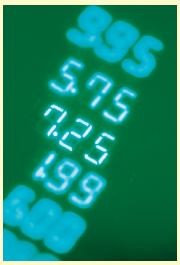
28. Round 23.969 to the nearest tenth.

29. Round 4.3809 to the nearest thousandth.

30. A line measured 8 centimeters and 2 millimeters. Write this measurement as a decimal with centimeter units.

31. The length of a laptop computer is 36 centimeters and 8 millimeters. The length of a laptop case is 36.5 centimeters. Is the case long enough to hold the laptop? Explain your reasoning.

Tic-Tac-Toe ~ Decimal Dash



Create a "Decimal Dash" board game. The board should have at least 30 spaces, each with a decimal number between 0.2 and 1.2. Use each decimal number in a space at least twice. Clearly mark the path from the "Start" to the "Finish".

Use two different colored dice to play the game. The dots on each die represent tenths
(1 dot = 0.1, 2 dots = 0.2)

Game rules:

Step 1: Choose one colored die for addition and one colored die for subtraction.
(i.e., Red die = addition, Blue die = subtraction)

Step 2: Roll both dice.

EXAMPLE 1: Roll both dice: Red rolls as 0.6; Blue rolls as 0.4.
0.6 > 0.4 so Red die is the larger decimal. You need to add.
0.6 + 0.4 = 1.0
Move forward to the next 1.0 space.

EXAMPLE 2: Roll both dice. Red rolls as 0.2; Blue rolls as 0.5.
0.2 < 0.5 so Blue die is the larger decimal. You need to subtract.
0.5 – 0.2 = 0.3
Move backward to the closest 0.3 space.
If both die are the same number, always add.

Step 3: The first one to make it to the end of the board wins.

Tic-Tac-Toe ~ Metric Madness

Investigate the metric system using the internet or class resources.

Create a table showing the different units of measurement in the metric system. What metric units can be used to measure length or height? What metric units can be used to measure mass? What metric units can be used to measure liquids?

Write a paragraph about the metric system. In what ways do you find the metric system different than the customary system (inches, feet, etc.) used in the United States? Which system do you prefer and why?