

Lesson 7

Books

Calvert Math

Student Assignments

□ MATHEMATICS

___ Complete Warm-up activity

___ Read p. 14, *Calvert Math*

___ Complete Skill Development activity

___ Complete Exercises 1–4, 7, 10, 13–14, 16, 18, and 29–34, p. 15, *Calvert Math*

Objective: to add positive and negative integers

Notes

Warm-up: Complete **Test Prep** 35–36 on p. 13 in *Calvert Math*.

Skill Development: Today you will add positive and negative integers. Read the top of p. 14 in *Calvert Math*. As p. 14 illustrates and as you may have done at various times in your math career, you can use a number line to add positive and negative integers. To add a positive integer, move to the right. To add a negative integer, move to the left. A number line is useful, and it is effective; however, it is not always convenient to use a number line when adding all integers. Notice that you can apply the absolute-value method when working with large or small integers. Remember that the sign of the integer with the greatest absolute value determines the sign of the sum of the two integers. Study the following two rules for adding integers.

To add integers with different signs, find the absolute value of each. Subtract the lesser absolute value from the greater absolute value. Give the result the sign of the number with the greater absolute value.

To add integers with the same sign, add their absolute values. The sum has the same sign as the numbers.

Check your work as you complete it to ensure your calculations are correct. Practice adding integers by completing the following problems. The answers can be found in the Lesson Manual Answer Key, located in the back of this manual.

1. $4 + -9 =$

2. $-10 + -8 =$

3. $-3 + 7 =$

Practice: For additional practice adding integers, complete **Exercises** 1–4, 7, 10, 13–14, 16, 18, and 29–34 on p. 15 in *Calvert Math*.



1.6 Adding and Subtracting Integers

Objective: to add and subtract integers

The temperature at 7:00 A.M. is -4°C .
The temperature rises 7°C by noon.
What is the temperature at noon?

$$-4 + 7 = ?$$

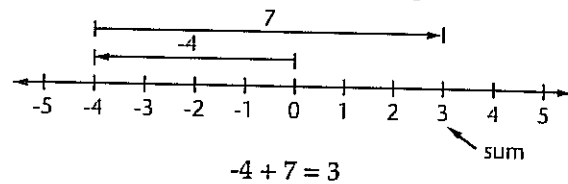
Addition can be shown on a number line. Move right when the sign is positive. Move left when the sign is negative.

$$-4 + 7 = 3$$

The temperature at noon is 3°C .

Do you think the temperature at noon is greater or less than 0?

Start at 0.
Move 4 units to the left.
From there move 7 units to the right.



More Examples

A. $-5 + 4 = -1$

The difference between 5 and 4 is 1.

B. $5 + -4 = 1$

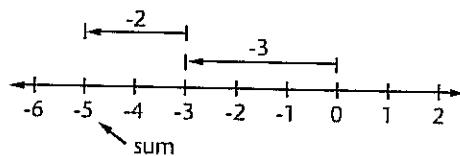
In each example, the sum has the same sign as the number with the greater absolute value. These examples suggest the following rule.



To add integers with different signs, find the absolute value of each. Subtract the lesser absolute value from the greater absolute value. Give the result the sign of the number with the greater absolute value.

C. Find $-3 + -2$.

$$-3 + -2 = -5$$



Start at 0.
Move 3 units to the left.
From there move 2 more units to the left.



To add integers with the same sign, add their absolute values. The sum has the same sign as the numbers.

Any subtraction sentence can be changed to a corresponding addition sentence.

Subtraction

Addition

D. $14 - 8 = 6$ $14 + -8 = 6$

E. $5.5 - 2 = 3.5$ $5.5 + -2 = 3.5$

↑ same results ↑



To subtract an integer, add its opposite.

TRY THESE

Write each subtraction expression as an addition expression. Then find each difference.

- | | | | |
|---------------|--------------|-----------------|----------------|
| 1. $6 - 10$ | 2. $7 - -6$ | 3. $-8 - -8$ | 4. $-9 - 5$ |
| 5. $18 - -18$ | 6. $25 - 25$ | 7. $-2.6 - 1.9$ | 8. $0.5 - 0.8$ |

Exercises

Add or subtract.

- | | | | |
|---------------|---------------------|-------------------|--------------------|
| 1. $6 + 8$ | 2. $-6 + 8$ | 3. $6 + -8$ | 4. $-6 + -8$ |
| 5. $4 - 11$ | 6. $-9 - 8$ | 7. $15 + -6$ | 8. $-2 - -4$ |
| 9. $8 - -6$ | 10. $3 + -15$ | 11. $-6.4 - -5.8$ | 12. $-8 - -14$ |
| 13. $-6 + -6$ | 14. $-34.3 + -24.1$ | 15. $7 - 25$ | 16. $1.8 + -3.1$ |
| 17. $18 - 7$ | 18. $-36 + 0$ | 19. $4 - -5 $ | 20. $ -10 - 18 $ |

Evaluate each expression if $x = -5$, $y = 3$, and $z = -4$.

- | | | | |
|----------------|---------------|---------------|-----------------|
| 21. $3 + x$ | 22. $z + 9$ | 23. $y - 7$ | 24. $x - y$ |
| 25. $ x + -6$ | 26. $ x - y $ | 27. $ z + y$ | 28. $x + y + z$ |

Add.

- | | | | |
|------------------|--------------------|----------------------|----------------------|
| 29. $-3 + 7 + 3$ | 30. $2 + -8 + -12$ | 31. $15 + -12 + -18$ | 32. $-25 + 32 + -15$ |
|------------------|--------------------|----------------------|----------------------|

Write an addition sentence for each problem. Then find the sum.

33. The temperature drops 7 degrees and then rises 11 degrees.
34. Ricardo loses 15 pounds, gains 6 pounds, and then loses 10 pounds.

Problem SOLVING

35. Mount Everest is the highest point in the world at 8,848 feet. The Dead Sea is the lowest point on land at -400 feet. meters
What is the difference in their elevations?
36. Does $|a + b|$ equal $|a| + |b|$ when a and b are positive integers? How about when a and b are negative numbers? How about when a is positive and b is negative? Explain your reasoning using your knowledge of absolute value and integers.

MIXED REVIEW

Simplify.

- | | | |
|-------------------------|---------------------------|-----------------------|
| 37. $3 + 5 \cdot 8$ | 38. $4 + (8 \cdot 3 - 1)$ | 39. $5^2 - (2 + 1)$ |
| 40. $-(12 - 8) + 5 + 6$ | 41. $4^2 + 4 \div 4$ | 42. $18 \div 3^2 + 5$ |

Lesson 83

Books

Calvert Math

Practice

Student Assignments

□ MATHEMATICS

___ Complete Warm-up activity

___ Read p. 170, *Calvert Math*

___ Complete **Try These** 1–2, p. 170, *Calvert Math*

___ Complete **Solve** 1–14, p. 171, *Calvert Math*

___ Work **Practice 83**, *Practice*

Objective: to identify necessary facts to solve word problems

Notes

Warm-up: Complete problems 28–30 of the **Cumulative Review** on p. 149 in *Calvert Math*.

Skill Development: Old detective TV shows have the main character hot on the trail in search of the facts to solve the mystery. Often times the detective needs to sift through a lot of extra details to get to the few key details that he needs. Sometimes solving a math problem becomes a similar mystery. It is up to you to become the detective on the search for what information is valuable to help you solve the problem. Sometimes you will even discover that you do not, in fact, have enough facts to solve the mystery. The combination of both of these becomes a vital problem-solving strategy.

Read the problem at the top of p. 170 in *Calvert Math*. In today's lesson you will need to identify if you have enough information to solve a problem—and if you do, what are the necessary facts you need? You may be given extra facts in a problem and do not need to use them. Be sure to remember the four problem-solving steps: read, plan, solve, and check. In today's problems you must first identify if there are extra facts or if there is not enough information. Then solve the problems, if you can. Clearly, if there are not enough facts, your mystery (and your problem) remains unsolved. Work **Try These** 1–2 on p. 170. Then complete **Solve** 1–14 on p. 171.

Practice: Work **Practice 83** in *Practice*.



6.12 Problem-Solving Strategy: Identifying Necessary Facts

Objective: to identify necessary facts to solve word problems

Mr. Reinhardt planted $\frac{5}{8}$ of his farm in corn, $\frac{1}{6}$ in soybeans, and $\frac{5}{24}$ in wheat. How many acres are planted in corn and soybeans?

Sometimes a problem may have more facts than you need to solve it. You must carefully choose the facts necessary to solve the problem.

A problem may not have all the facts you need to solve it. Carefully study the facts in the problem above.



You need to find the number of acres planted in corn and soybeans. You know the fraction of the farm planted in each.



To find the number of acres planted in corn and soybeans, you must perform two steps. First add the fractions planted in corn and soybeans. Then multiply that fraction by the number of acres on the farm.



Corn plus soybeans is part planted in corn and soybeans.

$$\frac{5}{8} + \frac{1}{6} = \frac{15}{24} + \frac{4}{24} = \frac{19}{24}$$

$\frac{5}{24}$ planted in wheat is an extra fact.

$\frac{19}{24} \times$ the number of acres = acres planted in corn and soybeans

You cannot multiply unless you know the number of acres on the farm.



The problem does not have all the facts you need to solve it.



State any extra or missing facts. Write *can be solved* or *cannot be solved* for each problem.

1. A $6\frac{1}{2}$ -foot board is to be cut into pieces of the same length. How long is each piece?
2. Mr. White buys $5\frac{1}{2}$ pounds of cookies. How much change does he receive from a ten-dollar bill?

Solve if possible. State any extra facts or any missing facts.

1. Jane has a test average of 82% in science. She correctly answered $\frac{3}{4}$ of the problems on her last test. If the test had 20 problems, how many did she answer correctly?
2. Jerry uses $1\frac{1}{3}$ square yards of material to make a wall hanging. At \$3.00 a square yard, what is the cost of the material for 3 wall hangings?
3. Joan Alioto earns \$4.50 an hour as a fitness advisor. She works 20 hours a week. In how many hours will she earn \$180?
4. A car with a 4-cylinder engine uses $8\frac{1}{2}$ gallons of gasoline on a 5-hour trip. How many miles per gallon is this?
5. In 5 years, the stock in an athletic shoe company went up \$11.50 to a price of \$20.25 a share. What is the average increase each year?
6. A bus gets 6.5 miles per gallon. The bus is driven about 220 miles a day. How many miles can the bus go on 22.6 gallons of gasoline?
7. A recipe calls for $2\frac{2}{3}$ cups of flour. Charlene has to triple the recipe. How many cups of flour does she need?
8. The population of Detroit is 2.36 times the population of Boston. What is the population of Detroit?
9. The six employees at Harris Sports Store work 10, 15, 12, 20, 40, and 40 hours each week. To the nearest tenth of an hour, what is the average weekly working time?
10. The odometer reading is 4,206.9 miles at the start of a trip and 4,365 at the end. Find the miles per gallon if 6.2 gallons of gasoline are used.
11. A school buys 3 grosses of pencils. Each gross (144 pencils) costs \$10.80. Find the cost of each pencil.
12. Rosalind Lucero paid \$1,536.00 tax in 1999 and \$1,623.60 in 2000. Find the average tax she paid each month in 1999.
13. Eight adult tickets to a game cost \$14.00. Children's tickets cost \$0.75 each. What is the cost of each adult ticket?
14. Mr. Cardenas paid \$50.00 down on a set of golf clubs and made 12 payments of \$21.50. Find the total amount he paid for the clubs.

Name _____

Problem-Solving Strategy: Identifying Necessary Facts

Solve, if possible. State any extra or missing facts.

1. The text of a book is 6 inches in length. It has margins both above and below the text that measure $\frac{6}{8}$ inch each. What is the length of the page?

2. Kamenko's home economics class is designing new uniforms for the cheerleading squad. A yard of the material costs \$5.98. If each uniform requires $3\frac{3}{8}$ yards of material, how many yards are needed to make 16 uniforms?

3. Anthony was $20\frac{1}{2}$ inches long when he was born. How much did he grow in 19 years?

4. Anna's tailor made her 2-piece dance costume, requiring $2\frac{7}{8}$ yards of material for one part and $1\frac{1}{4}$ yards for the other. How much material did the tailor use for the costume?

5. There are 180 students in the eighth grade at Atherton Middle School. If $\frac{4}{9}$ of them are girls, how many boys are there?

6. Ling worked Mondays, Wednesdays, and Fridays after school from 4:00 until 6:00. How much did she make in 1 week?

7. At Mercury Mechanics, Antonio can assemble a motor in 7 hours while Paul can do the same job in $5\frac{3}{4}$ hours. Each man makes \$9.79/hour. In how much less time can Paul do the job?

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PRACTICE

8. On a map, the scale is 1 inch = 20 miles. How many miles do $5\frac{3}{4}$ inches represent?

9. Diego and Jenny estimate that their house is worth \$99,000; however, the professional assessment places the value at $\frac{5}{6}$ of that price. What is the assessed value?

10. If an airplane flies 1,460 kilometers, what is its average ground speed in kilometers per hour?
