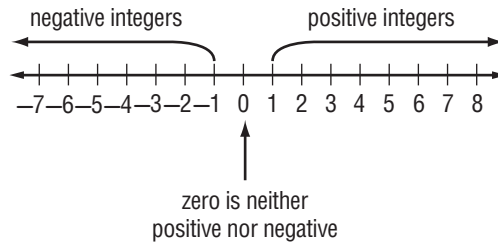# Lesson 1 Reteach

Integers and Absolute Value

Integers less than zero are **negative integers.** Integers greater than zero are **positive integers.**

negative integers   positive integers

$$-7\ -6\ -5\ -4\ -3\ -2\ -1\quad 0\quad 1\ \ 2\ \ 3\ \ 4\ \ 5\ \ 6\ \ 7\ \ 8$$

zero is neither
positive nor negative

The absolute value of an integer is the distance the number is from zero on a number line. Two vertical bars are used to represent absolute value. The symbol for absolute value of 3 is $|3|$.

Example 1

Write an integer that represents 160 feet below sea level.

Because it represents *below* sea level, the integer is -160.

Example 2

Evaluate $|-2|$.

On the number line, the point -2 is
2 units away from 0. So, $|-2| = 2$.

$$-4\ \ -3\ \ -2\ \ -1\ \ 0\ \ 1\ \ 2\ \ 3\ \ 4$$

Exercises

Write an integer for each situation.

1. 12°C above zero

2. a loss of $24

3. a gain of 20 pounds

4. falling 6 feet

Evaluate each expression.

5. $|12|$

6. $|-150|$

7. $|-8| + 2$

8. $|6| + |5|$

9. $|-19| - 17$

10. $|84| - |-62|$

Lesson 1 Skills Practice

Integers and Absolute Value

Write an integer for each situation.

1. 15°C below zero

2. a profit of $27

3. 2010 A.D.

4. average attendance is down 38 people

5. 376 feet above sea level

6. a withdrawal of $200

7. 3 points lost

8. a bonus of $150

9. a deposit of $41

10. 240 B.C.

11. a wage increase of $120

12. 60 feet below sea level

Evaluate each expression.

13. $|-1|$

14. $|9|$

15. $|23|$

16. $|-107|$

17. $|-45|$

18. $|19|$

19. $|0|$

20. $|6|-|-2|$

21. $|-8|+|4|$

22. $|-12|-|12|$

Graph each set of integers on a number line.

23. $\{0, 2, -3\}$

24. $\{-4, -1, 3\}$
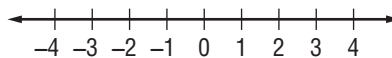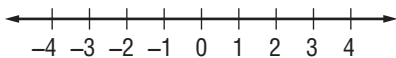
Lesson 2 Reteach

Add Integers

To add integers with the same sign, add their absolute values. The sum is:

- positive if both integers are positive.
- negative if both integers are negative.

To add integers with different signs, subtract their absolute values. The sum is:

- positive if the positive integer's absolute value is greater.
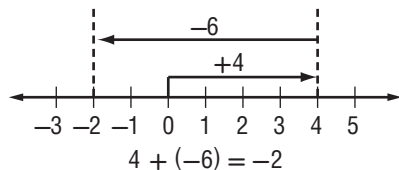- negative if the negative integer's absolute value is greater.

To add integers, it is helpful to use a number line.

Example 1

Find $4 + (-6)$.

Use a number line.

- Start at 0.
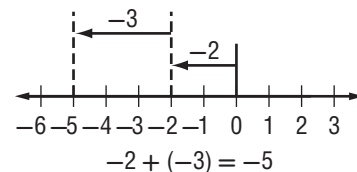- Move 4 units right.
- Then move 6 units left.

$$4 + (-6) = -2$$

Example 2

Find $-2 + (-3)$.

Use a number line.

- Start at 0.
- Move 2 units left.
- Move another 3 units left.

$$-2 + (-3) = -5$$

Exercises

Add.

1. $-5 + (-2)$

2. $8 + 1$

3. $-7 + 10$

4. $16 + (-11)$

5. $-22 + (-7)$

6. $-50 + 50$

7. $-10 + (-10)$

8. $100 + (-25)$

9. $-35 + (-20)$

10. $-7 + (-3) + 10$

11. $-42 + 36 + (-36)$

12. $-17 + 17 + 9$

Write an addition expression to describe each situation. Then find each sum.

13. HAWK A hawk is in a tree 100 feet above the ground. It flies down to the ground.

14. RUNNING Leah ran 6 blocks north then back 4 blocks south.

Lesson 2 Skills Practice

Add Integers

Add.

1. $5 + (-8)$

2. $-3 + 3$

3. $-3 + (-8)$

4. $-7 + (-7)$

5. $-8 + 10$

6. $-7 + 13$

7. $15 + (-10)$

8. $-11 + (-12)$

9. $25 + (-12)$

10. $-14 + (-13)$

11. $14 + (-27)$

12. $-28 + 16$

13. $5 + 11 + (-5)$

14. $7 + (-5) + 5$

15. $9 + (-9) + 10$

16. $-2 + 19 + 2$

17. FOOTBALL The Dolphins football team gained 16 yards on their first play then lost 11 yards on the next play. Write an addition expression to represent this situation. Find the sum and explain its meaning.

18. SAVINGS ACCOUNT Demetrius deposits $120 into his account. One week later, he withdraws $36. Write an addition expression to represent this situation. How much higher or lower is the amount in his account after these two transactions?

Lesson 3 Reteach

Subtract Integers

To subtract an integer, add its opposite.

Example 1

Find 6 − 9.

$6 - 9 = 6 + (-9)$ To subtract 9, add −9.
      $= -3$ Simplify.

Example 2

Find −10 − (−12).

$-10 - (-12) = -10 + 12$ To subtract −12, add 12.
          $= 2$ Simplify.

Example 3

Evaluate $a - b$ if $a = -3$ and $b = 7$.

$a - b = -3 - 7$ Replace a with −3 and b with 7.
     $= -3 + (-7)$ To subtract 7, add −7.
     $= -10$ Simplify.

Exercises

Subtract.

1. $7 - 9$

2. $20 - (-6)$

3. $-10 - 4$

4. $0 - 12$

5. $-7 - 8$

6. $13 - 18$

7. $-20 - (-5)$

8. $-8 - (-6)$

9. $25 - (-14)$

10. $-75 - 50$

11. $15 - 65$

12. $19 - (-10)$

Evaluate each expression if $m = -2$, $n = 10$, and $p = 5$.

13. $m - 6$

14. $9 - n$

15. $p - (-8)$

16. $p - m$

17. $m - n$

18. $-25 - p$

Lesson 3 Skills Practice

Subtract Integers

Subtract.

1. $5 - 2$

2. $6 - (-7)$

3. $-3 - 2$

4. $8 - 13$

5. $-7 - (-7)$

6. $6 - 12$

7. $15 - (-7)$

8. $-15 - 6$

9. $-3 - 8$

10. $-10 - 12$

11. $13 - (-12)$

12. $14 - (-22)$

13. $10 - (-20)$

14. $-16 - 14$

15. $-25 - 25$

16. $6 - (-31)$

17. $-18 - (-40)$

18. $15 - (-61)$

Evaluate each expression if $r = -4$, $s = 10$, and $t = -7$.

19. $r - 7$

20. $t - s$

21. $s - (-8)$

22. $t - r$

23. $s - t$

24. $r - s$

Reteach

Problem-Solving Investigation: Look for a Pattern

Looking for a pattern is one strategy that can help you when solving problems. You can use the four-step problem-solving plan along with looking for a pattern to solve problems.

Understand	• Determine what information is given in the problem and what you need to find.
Plan	• Select a strategy, including a possible estimate.
Solve	• Solve the problem by carrying out your plan.
Check	• Examine your answer to see if it seems reasonable.

Example 1

MEMBERSHIP **The local tennis club started the year with 675 members. In one month, they had 690 members. After two months, they had 705 members. After three months, they had 720 members. When the tennis club reaches 750 members, they will close their enrollment. How many months will it take the club to reach their maximum enrollment if they continue adding new members at the same rate?**

Understand   The club began with 675 members and is adding new members every month. It needs to find out when it reaches its maximum enrollment of 750 members.

Plan   Look for a pattern or rule that increases the membership each month. Then use the rule to extend the pattern to find the solution.

Solve   After the initial 675 members, 15 new members joined each month. Extend the pattern to find the solution.

$$675, \quad 690, \quad 705, \quad 720, \quad 735, \quad 750$$
$$+15 \quad +15 \quad +15 \quad +15 \quad +15$$

They will have reached their maximum enrollment in 5 months.

Check   They increased by $5 \cdot 15$ or 75 members in 5 months, which, when added to the original 675 members, is $675 + 75 = 750$. So, 5 months is a reasonable answer.

Exercises

1. **PRODUCE** A farmer has 42 apples on his front porch. The next day, there are only 36 apples left on the porch. After 2 days, there are only 30 apples left on the porch, and in 3 days, 24 apples remain on the porch. After how many days will there be no more apples on the porch if the same amount continues to disappear each day?

2. **TELEPHONE** A hotel charges a standard rate of $3 per international phone call. After one minute, the charge is $4.50. In two minutes, the charge is $6.00. If Susan only has $10.00, how long can her phone conversation be if the charges per minute stay constant?

Skills Practice

Problem-Solving Investigation: Look for a Pattern

Use the *look for a pattern* strategy to solve the problem.

1. **NUMBERS** What are the next two numbers in the pattern listed below?
   7, 21, 63, 189, …

2. **POPULATION** The Springfield Zoo is breeding gorillas. They have
   3 gorillas which can mate and give birth. After the first year there are
   7 gorillas. After the second year there are 11 gorillas. If the gorillas
   continue to increase at the same rate, how long will it take for the
   Springfield Zoo to have 35 gorillas?

3. **ALGEBRA** Read the table below to find a pattern relating x and y.

x	y
1	5
2	8
3	11
4	14
5	17

4. **SAVINGS** Maria receives $50 for her birthday. She decides to put the
   money into a bank account and start saving her money from babysitting
   in order to buy a television that costs $200. After the first week she
   has $74. After the second week, she has $98. After the third week she
   has $122. How many weeks will she have to save at the same rate in
   order to buy the television?

Lesson 4 Reteach

Multiply Integers

The product of two integers with **different** signs is **negative**.

The product of two integers with the **same** sign is **positive**.

Example 1
Find 5(−2).

$5(-2) = -10$ The integers have different signs. The product is negative.

Example 2
Find −3(7).

$-3(7) = -21$ The integers have different signs. The product is negative.

Example 3
Find −6(−9).

$-6(-9) = 54$ The integers have the same sign. The product is positive.

Example 4
Find $(-7)^2$.

$(-7)^2 = (-7)(-7)$ There are 2 factors of −7.
$\qquad = 49$ The product is positive.

Example 5
Find −2(−3)(4).

$-2(-3)(4)$
$= 6(4)$ Multiply −2 and −3.
$= 24$ Multiply 6 and 4.

Exercises
Multiply.

1. $-5(8)$ **2.** $-3(-7)$ **3.** $10(-8)$

4. $-8(3)$ **5.** $-12(-12)$ **6.** $(-8)^2$

7. $-5(7)$ **8.** $3(-2)$ **9.** $-6(-3)$

10. $5(-4)(5)$ **11.** $-4(-4)$ **12.** $2(-3)(5)$

13. $-2(-3)$ **14.** $9(-4)$ **15.** $(-3)(-4)$

16. $-3(-3)(5)$ **17.** $-2(5)^2$ **18.** $(-3)(-4)(5)$

Lesson 4 Skills Practice

Multiply Integers

Multiply.

1. $-4(6)$

2. $-2(-8)$

3. $12(-4)$

4. $-6(5)$

5. $-10(-9)$

6. $-(5)^2$

7. $(-5)^2$

8. $-30(5)$

9. $20(-6)$

10. $-14(-6)$

11. $(-13)^2$

12. $-7(15)$

13. $-3(4)$

14. $7(-3)$

15. $3(-3)$

16. $-2(-10)$

17. $(-5)(-3)(4)$

18. $-3(-3)(4)$

19. $-3(-5)$

20. $5(-3)$

21. $7(-5)(4)$

22. $-2(-5)(-3)$

23. $-10(-3)$

24. $-2(-3)^2$

Lesson 5 Reteach

Divide Integers

The quotient of two integers with different signs is negative.

The quotient of two integers with the same sign is positive.

Example 1

Find 30 ÷ (−5).

$30 \div (-5)$ The integers have different signs.

$30 \div (-5) = -6$ The quotient is negative.

Example 2

Find −100 ÷ (−5).

$-100 \div (-5)$ The integers have the same sign.

$-100 \div (-5) = 20$ The quotient is positive.

Exercises

Divide.

1. $-12 \div 4$

2. $-14 \div (-7)$

3. $\dfrac{18}{-2}$

4. $-6 \div (-3)$

5. $-10 \div 10$

6. $\dfrac{-80}{-20}$

7. $350 \div (-25)$

8. $-420 \div (-3)$

9. $\dfrac{540}{45}$

10. $\dfrac{-256}{16}$

ALGEBRA Evaluate each expression if $d = -24$, $e = -4$, and $f = 8$.

11. $12 \div e$

12. $40 \div f$

13. $d \div 6$

14. $d \div e$

15. $f \div e$

16. $e^2 \div f$

17. $\dfrac{-d}{e}$

18. $ef \div 2$

19. $\dfrac{f + 8}{-4}$

20. $\dfrac{d - e}{5}$

Lesson 5 Skills Practice

Divide Integers

Divide.

1. $-15 \div 3$

2. $-24 \div (-8)$

3. $22 \div (-2)$

4. $-49 \div (-7)$

5. $-8 \div (-8)$

6. $\dfrac{36}{-4}$

7. $225 \div (-15)$

8. $\dfrac{0}{-9}$

9. $-38 \div 2$

10. $\dfrac{64}{4}$

11. $-500 \div (-50)$

12. $-189 \div (-21)$

ALGEBRA Evaluate each expression if $m = -32$, $n = 2$, and $p = -8$.

13. $m \div n$

14. $p \div 4$

15. $p^2 \div m$

16. $m \div p$

17. $\dfrac{-p}{n}$

18. $p \div (-n^2)$

19. $\dfrac{p}{4n}$

20. $\dfrac{18 - n}{-4}$

21. $\dfrac{m + 8}{-4}$

22. $\dfrac{m + n}{6}$