

## Lesson 2.1 Skills Practice

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### The Think Tank Prime Factorization and Factor Trees

#### Vocabulary

Match each definition to its corresponding term.

- |  |   |
|--|---|
| 1. A diagram that uses branches to show how a number can be written as the product of prime numbers.                           | a. Associative Property of Multiplication |
| 2. The expression of a composite number as a product of prime numbers.   | b. base                                   |
| 3. An expression that represents repeated multiplication of a factor.  | c. Fundamental Theorem of Arithmetic      |
| 4. The factor that is repeatedly multiplied in a power.  | d. prime factorization                    |
| 5. A property that states that changing the grouping of the factors in a multiplication statement does not change the product. | e. exponent                               |
| 6. The number of times a base is used as a factor of repeated multiplication.  | f. factor tree                            |
| 7. A theorem that states that every natural number is either prime or can be uniquely written as a product of primes.          | g. power                                  |

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**Problem Set**

Write the prime factorization for each number. List the factors in order from least to greatest.

1. 12

$$\begin{aligned} 12 &= 2 \times 6 \\ &= 2 \times 2 \times 3 \end{aligned}$$

2. 30

3. 24

4. 18

5. 40

6. 27

7. 55

8. 36

9. 60

10. 20

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Rewrite each set of factors using the Associative Property of Multiplication.  
Show that the original grouping and the new grouping are equivalent.

11.  $(2 \times 3) \times 4 = 2 \times (3 \times 4)$   
 $(2 \times 3) \times 4 = 2 \times (3 \times 4)$   
 $6 \times 4 = 2 \times 12$   
 $24 = 24$

12.  $(2 \times 2) \times 5 =$  \_\_\_\_\_

13.  $3 \times (5 \times 3) =$  \_\_\_\_\_

14.  $4 \times (2 \times 6) =$  \_\_\_\_\_

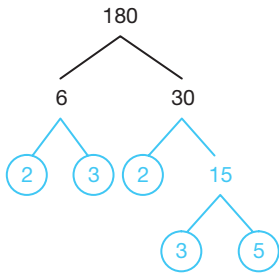
15.  $(2 \times 2) \times (4 \times 3) =$  \_\_\_\_\_

16.  $(3 \times 2) \times (5 \times 2) =$  \_\_\_\_\_

2

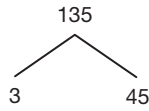
Complete each factor tree. Then write the prime factorization for each number. List the factors in order from least to greatest.

17.

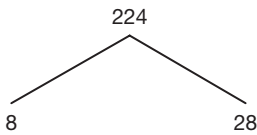


$$180 = 2 \times 2 \times 3 \times 3 \times 5$$

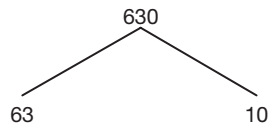
18.



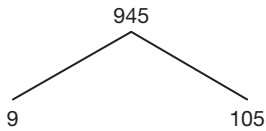
19.



20.



21.



22.



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Identify the base and the exponent in each power. Then write each power in words.

23.  $5^2$

24.  $7^3$

The base is 5 and the exponent is 2.

Sample answer: Five squared.

2

25.  $4^5$

26.  $3^2$

27.  $2^9$

28.  $8^3$

2

Complete each factor tree. Then write the prime factorization for each number. List the factors in order from least to greatest using powers.

29.

$216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$   
 $= 2^3 \cdot 3^3$

30.

31.

32.

33.

34.

## Lesson 2.2 Skills Practice

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### Together Again Investigating Multiples and Least Common Multiples

#### Vocabulary

Write a definition for each term in your own words.

1. common multiple
  
2. least common multiple (LCM)

#### Problem Set

List the multiples of each number. Then, determine the least common multiple.

1. 6, 9  
Multiples of 6: 6, 12, 18, 24. . .  
Multiples of 9: 9, 18, 27. . .  
The LCM of 6 and 9 is 18.

2. 12, 30

3. 4, 7

4. 42, 70

2

5. 8, 11

6. 24, 40

7. 9, 15, 18

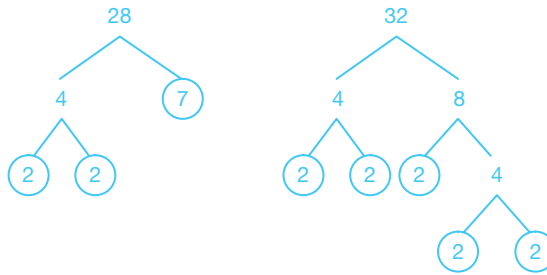
8. 4, 14, 8



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Write the prime factorization for each number. Then, determine the least common multiple.

**9.** 28, 32



$$28 = 2^2 \cdot 7$$

$$32 = 2^5$$

$$\text{LCM} = 2^5 \cdot 7$$

$$= 224$$

The LCM of 28 and 32 is 224.

**10.** 40, 100

**2**

11. 18, 45

2

12. 30, 70

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13. 50, 105

14. 126, 84

15. 12, 50, 90

2

16. 10, 12, 15

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Use the scenario to answer each question.

- 17.** Ronna has volleyball practice every 4 days. Ronna also has violin lessons every 10 days. She has both activities today after school. When will she have both activities again on the same day?

$$4 = 2^2$$

$$10 = 2 \cdot 5$$

$$\text{LCM} = 2^2 \cdot 5$$

$$= 20$$

Ronna will have both activities again 20 days from today.

- 18.** Emilio's family volunteers at the local soup kitchen every 30 days. Emilio has swimming lessons every 9 days. He has both activities this Saturday. When will he have both activities again on the same day?

**2**

**19.** At the middle school, the bell rings every 40 minutes to tell the students to change classes. Across the street the clock above city hall chimes every 30 minutes. Both the school bell and the clock ring at noon. When will both bells ring again at the same time?

**20.** Belinda babysits her neighbor's children in the evening every 14 days. Belinda goes to visit her grandmother in the afternoon every 21 days. Belinda has both activities planned for today. Will Belinda have both activities again on the same day within 30 days? Explain your reasoning.

## Lesson 2.3 Skills Practice

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### Happenings at Harvest Day Investigating Factors and Greatest Common Factors

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#### Vocabulary

Choose the term from the box that best completes each statement.

common factor    greatest common factor (GCF)    relatively prime numbers

1. A \_\_\_\_\_ is a number that is a factor of 2 or more numbers.
2. Two numbers which do not have any common factors other than 1 are called \_\_\_\_\_.
3. The \_\_\_\_\_ is the largest factor that 2 or more numbers have in common.

#### Problem Set

List the factors of each number. Then, determine the greatest common factor.

1. 25, 45

2. 48, 20

Factors of 25: 1, 5, 25

Factors of 45: 1, 5, 9, 45

The greatest common factor of 25  
and 45 is 5.

3. 32, 56

4. 15, 16

2

5. 32, 80

6. 25, 36

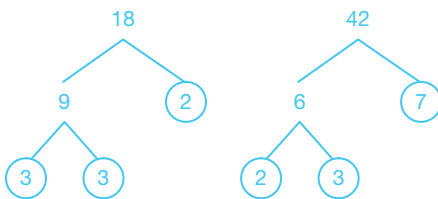
7. 14, 28, 49

8. 27, 18, 99

Write the prime factorization for each number. Then, determine the greatest common factor.

9. 18, 42

10. 56, 72



$$18 = 2 \cdot 3^2$$

$$42 = 2 \cdot 3 \cdot 7$$

$$\text{GCF} = 2 \cdot 3$$

$$= 6$$

The GCF of 18 and 42 is 6.



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11. 54, 45

12. 48, 108

13. 72, 90

14. 36, 60

15. 8, 27, 35

2

16. 20, 90, 50

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Use the scenario to answer each question.

17. Shanise is creating treat bags for her birthday party guests. She has 32 packs of gum, 24 bracelets, and 16 tiaras. What is the greatest number of treat bags she can make if she wants to use all of the items and have the same number of each treat in each bag? How many of each treat will be in a bag?

$$32 = 2^5$$

$$24 = 2^3 \cdot 3$$

$$16 = 2^4$$

$$\text{GCF} = 2^3$$

$$= 8$$

Shanise can make 8 treat bags. Each bag will contain 4 packs of gum, 3 bracelets, and 2 tiaras.

18. Yuko is volunteering at the food bank. He is creating Thanksgiving food baskets to give to local families. He has 192 cornbread muffins, 96 cans of vegetables, and 64 boxes of stuffing mix. What is the greatest number of baskets Yuko can create if he wants to use all of the items and have the same number of each item in each basket? How many of each item will be in a basket?

**2**

**19.** Hector is dividing students into groups for a nature hike. He wants to divide the boys and girls so that each group has the same number of both boys and girls. There are 21 boys and 56 girls signed up for the hike. Into how many groups can the students be divided? How many boys and how many girls will be in each group?

**20.** Ramona is filling window box planters that will be sold to benefit a local charity. She has 56 pansies, 42 tulips, and 28 marigolds. What is the greatest number of planters she can fill if she wants to use all of the flowers and have the same number of each type of flower in each planter? How many of each flower type will be in a planter?

## Lesson 2.4 Skills Practice

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### Common Factors or Common Multiples? Using GCF and LCM to Solve Problems

2

#### Problem Set

Use the scenario to answer each question.

1. Clayton has football practice every 4 days. He also has band practice every 6 days. He has both activities today after school. When will he have both activities again on the same day?

$$4 = 2^2$$

$$6 = 2 \cdot 3$$

$$\text{LCM} = 2^2 \cdot 3$$

$$= 12$$

Clayton will have both activities again 12 days from today.

2. Eva volunteers at the retirement community center every 45 days. She also has choir practice every 6 days. She has both activities planned for this Sunday. When will she have both activities again on the same day?

**2**

3. Juan is creating gift bags for his birthday party guests. He has 14 sliding puzzles, 28 baseball cards, and 21 rubber snakes. What is the greatest number of gift bags he can make if he wants to use all of the items and have the same number of each item in each bag? How many of each item will be in a bag?
4. Isabel is organizing teams for a scavenger hunt. She wants to divide the boys and girls so that each group has the same number of both boys and girls. There are 45 boys and 30 girls that want to participate. What is the greatest number of teams Isabel can make? How many boys and how many girls will be on each team?
5. Teresa is baking cookies and muffins for the school bake sale. She puts a new pan of cookies into one oven every 12 minutes. She puts a new pan of muffins into the second oven every 18 minutes. She begins by putting pans into both ovens at same time. How long will it be before both ovens are ready for a new pan of cookies or muffins at the same time?

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6. Ling is making snack bags for the class field trip to the museum. To fill the bags she has 48 cereal bars, 72 boxes of raisins, and 24 bottles of water. What is the greatest number of snack bags Ling can make if she wants to use all of the items and have the same number of each item in each bag? How many of each item will be in a bag?

2

7. To wake up in the morning, Noah sets two alarms on his alarm clock. The first alarm rings every 9 minutes until it is turned off. The second alarm rings every 12 minutes until it is turned off. Both alarms are set to ring at 6:30 AM. What time will it be when both alarms sound again at the same time?

8. Olivia has piano lessons every 8 days. She also has dance class every 10 days. She has both activities scheduled for today after school. When will she have both activities again on the same day?

**2**

9. Roberto is volunteering to organize care packages to send to troops overseas. To fill the care packages he has 180 different magazines, 135 candy bars, 90 decks of playing cards, and 90 notepads. What is the greatest number of care packages Roberto can make if he wants to use all of the items and have the same number of each item in each package? How many of each item will be in a package?

10. Rosa is organizing fruit baskets to sell at a school fundraising event. She has 104 bananas, 52 apples, 78 oranges, and 26 pineapples. What is the greatest number of fruit baskets Rosa can make if she wants to use all of the fruit and have the same number of each type of fruit in each basket? How many of each fruit will be in a basket?



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11. Deon schedules a haircut every 8 weeks. His sister, Kiana, schedules a haircut every 6 weeks. Deon and Kiana's mother schedules a haircut every 4 weeks. All three have haircuts scheduled for this evening. When will all three have haircuts again on the same day?

2

12. Cristina is organizing students into groups for a History Club trip to the natural history museum. Each group will be responsible for learning about an exhibit and giving a report to the club. There are 24 fifth grade students, 12 sixth grade students, and 18 seventh grade students in the club. She wants each group to contain the same number of students from each grade. What is the greatest number of groups Cristina can make? How many students from each grade will be in a group?

