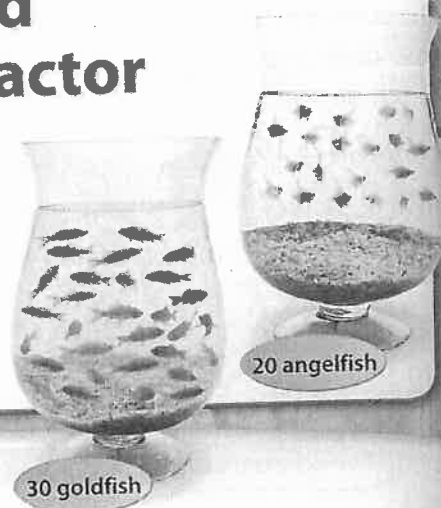


**Understand It!**  
Some numbers have common factors other than 1.

# Common Factors and Greatest Common Factor

How can you find the greatest common factor?

A pet store has goldfish and angelfish that have to be put into the fewest number of glass containers. Each container must contain the same number of fish, and each must contain all goldfish or all angelfish.



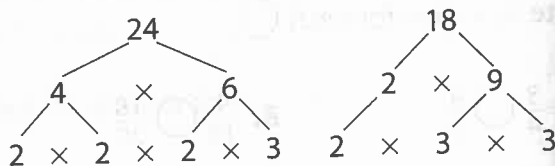
**Another Example** How can you use prime factorization to find the GCF of two numbers?

**Step 1** Find the prime factors of each number.

**Step 2** List the prime factors of each number.

$$24 = 2 \times 2 \times 2 \times 3$$

$$18 = 2 \times 3 \times 3$$



**Step 3** Circle the prime factors that both numbers share. Here they share the numbers 2 and 3.

$$24 = \textcircled{2} \times 2 \times 2 \times \textcircled{3}$$

$$18 = \textcircled{2} \times 3 \times \textcircled{3}$$

**Step 4** Multiply the common factors.  $2 \times 3 = 6$

So, the GCF of 18 and 24 is 6.

## Guided Practice\*

### Do you know HOW?

For 1 through 4, find the GCF of each pair of numbers.

1. 9 and 12

3

2. 20 and 45

5

3. 7 and 28

7

4. 18 and 32

2

### Do you UNDERSTAND?

5. If two numbers are prime, what is their GCF?

1

6. **Writing to Explain** In the example above, how would the GCF change if there were 40 goldfish?



Find the greatest common factor (GCF) of 20 and 30 to find the greatest number of fish that could be put into each container.

If a number is a factor of two numbers, it is called a common factor.

The greatest common factor (GCF) of two numbers is the greatest number that is a factor of both numbers.

### One Way

To find the greatest common factor of 20 and 30, you can list all the factors of each number and circle all the common factors.

20: 1, 2, 4, 5, 10, 20

30: 1, 2, 3, 5, 6, 10, 15, 30

The GCF of 20 and 30 is 10.

So, the store can put 10 fish in each container.

## Independent Practice

In 7 through 18, find the greatest common factor (GCF) of each number using prime factorization or a list of factors.

7. 20 and 35

5

8. 16 and 18

2

9. 15 and 6

3

10. 24 and 36

12

11. 48 and 30

6

12. 22 and 77

11

13. 100 and 96

4

14. 60 and 32

4

15. 90 and 81

9

16. 72 and 27

9

17. 11 and 15

1

18. 14 and 21

7

### Problem Solving

19. Rick Hansen holds the record for the longest journey by wheelchair. He wheeled his wheelchair across 4 continents and 34 countries. What is the GCF of 4 and 34?

A 1    **B 2**    C 4    D 17

20. Which list shows all the common factors of 36 and 54?

A 1, 2, 3, 6    **C 1, 2, 3, 6, 9, 18**  
 B 1, 2, 3, 6, 9    D 1, 2, 3, 6, 9, 12, 18

21. If you buy a television for \$486, including tax, and are allowed to pay for it in 6 equal payments, how much will each payment be? **\$81**

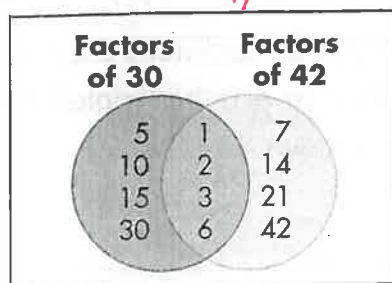
22. How many pairs of factors does 40 have? List them.

4 pairs: 1, 40    5, 8  
 2, 20  
 4, 10

The **Venn diagram** at the right shows the common factors and the GCF of 30 and 42.

23. What does each region of the diagram show?

24. Use a Venn diagram to show the common factors of 48 and 72. What is the GCF?



1. Choose the answer that shows the numbers in order from least to greatest.

(A)  $\frac{5}{8}, \frac{2}{3}, 1\frac{3}{4}, 1\frac{12}{14}$

B  $\frac{2}{3}, \frac{5}{8}, 1\frac{3}{4}, 1\frac{12}{14}$

C  $\frac{2}{3}, \frac{5}{8}, 1\frac{12}{14}, 1\frac{3}{4}$

D  $\frac{5}{8}, \frac{2}{3}, 1\frac{12}{14}, 1\frac{3}{4}$

2. Bae has to travel  $4\frac{7}{8}$  miles from his house to get to his best friend's house,  $4\frac{5}{6}$  miles to get to school,  $4\frac{3}{4}$  miles to get to the library, and  $4\frac{2}{3}$  miles to get to the nearest park. Which is the farthest from Bae's house?

A The nearest park

(B) His best friend's house

C The library

D School

3. Compare the following pairs of numbers. Write  $<$ ,  $>$ , and  $=$  for each  $\bigcirc$ .

$$3\frac{3}{4} \bigcirc 3\frac{12}{16}$$

$$1\frac{4}{5} \bigcirc \frac{12}{15}$$

$$\frac{9}{10} \bigcirc \frac{10}{12}$$

4. Draw the same fraction in two different ways. (Example: 1 marble in a set of two represents  $\frac{1}{2}$ , and a triangle divided evenly in two parts, with one part shaded, also represents  $\frac{1}{2}$ .)

**The student can draw any two differing representations of the same fraction.**

# Problem of the Day

## 9-6

Jerome exercises every other day. He waters his plants every third day. Every fourth day he cleans his room. Today he does each of these things. In how many days will this happen again?

*in 12 days*

Problem of the Day

9-6

# Common Factors and Greatest Common Factor

1. Factors of 27

1, 3, 9, 27

2. Factors of 36

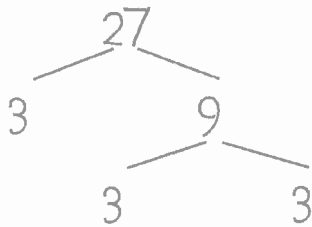
1, 2, 3, 4, 6, 9, 12, 18, 36

3. Common Factors of 27 and 36

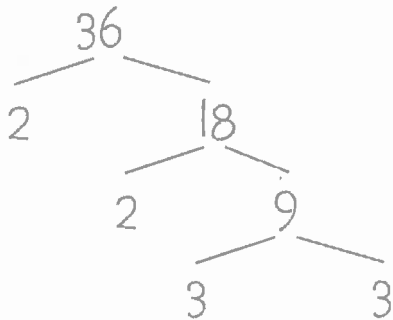
1, 3, 9

4. Greatest Common Factor is 9

5.



6.



7. 27 and 36 both have 3 as a factor twice.

8. Greatest Common Factor is  $3 \times 3 = 9$

- Maya is 16 years old. Her mother is 44 years old. What is the greatest common factor of their ages?
  - 3
  - 4
  - 5
  - 6
- Which list shows all the common factors of 32 and 48?
  - 1, 2, 4, 8
  - 1, 2, 4, 8, 16
  - 1, 2, 4, 6, 8, 12
  - 1, 2, 4, 6, 8, 12, 24
- What is the greatest common factor of 60 and 72?
  - 10
  - 12
  - 24
  - 36
- Writing to Explain** Sean is dividing apple and orange slices into bowls for a party. He has 42 apple slices and 36 orange slices. He wants to use the fewest number of bowls, but each bowl must have the same number of slices and must have only apple or orange slices. What is the greatest number of slices he can put in each bowl? Explain how you got your answer.

See student samples at the right.

42      prime factorization      36

$2 \times 3 = 6$   
 6 slices