

Common Factors and Multiples

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

Find the GCF of 12 and 18.

THINK

- List the factors of each. **Factors of 12: 1, 2, 3, 4, 6, 12**
Factors of 18: 1, 2, 3, 6, 9, 18
- List the common factors of 12 and 18. **1, 2, 3, 6**
- Find the greatest common factor. **1, 2, 3, 6**

The GCF of 12 and 18 is 6.

A *common multiple* of two numbers is a number that is a multiple of both numbers. The *least common multiple* (LCM) is the smallest of the nonzero common multiples.

Find the LCM of 9 and 15.

- Write the multiples of 15 until a common multiple is found.
Multiples of 15: 15
30
45
- Determine if each multiple is also a multiple of 9.
15 No
30 No
45 Yes

$$5 \cdot 9 = 45$$

The LCM of 9 and 15 is 45.

Exercises

Find all common factors and the GCF of each pair of numbers.

1. 35 and 50 2. 12 and 14 3. 24 and 25 4. 24 and 26
5. 48 and 64 6. 15 and 25 7. 48 and 50 8. 120 and 121
9. 10, 15, and 20 10. 8, 10, and 12 11. 16, 24, and 30 12. 18, 36, and 45

Find the LCM of each pair.

13. 10 and 15 14. 5 and 6 15. 20 and 12 16. 20 and 3
17. 40 and 25 18. 9 and 30 19. 15 and 25 20. 7 and 21

Find the GCF and LCM of each pair of numbers.

21. 9 and 6 22. 4 and 6 23. 10 and 15 24. 48 and 16
25. 50 and 75 26. 8 and 36 27. 20 and 100 28. 10 and 12
29. 12 and 14 30. 50 and 100 31. 75 and 50 32. 17 and 34
33. 3, 6, and 9 34. 10, 12, and 20 35. 6, 9, and 12 36. 2, 3, and 4

A common factor of two numbers must divide their difference.

Use this fact to find the common factors of each pair.

37. 17 and 19 38. 300 and 312 39. 120 and 125 40. 17 and 19
41. 100 and 118 42. 24 and 25 43. 36 and 72 44. 16 and 24

Equivalent Fractions

A fraction shows a comparison to one whole unit.

- A fraction shows part of a region.

$\frac{4}{7}$ of the rectangle is shaded.



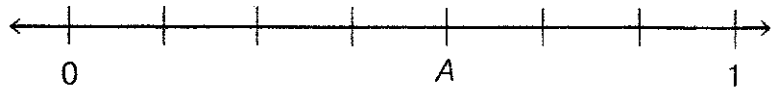
- A fraction shows part of a set.

$\frac{4}{7}$ of the boxes are red.



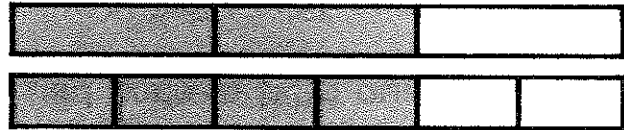
- A fraction shows the distance from zero on the number line.

The distance from zero to A is $\frac{4}{7}$.



Fractions that show the same amount are called *equivalent* fractions.

$\frac{2}{3}$ and $\frac{4}{6}$ are equivalent. So, $\frac{2}{3} = \frac{4}{6}$.



Change $\frac{2}{3}$ to an equivalent fraction with denominator 12.

THINK

1. Write an equation.

$$\frac{2}{3} = \frac{8}{12}$$

2. Multiply the numerator and denominator by the same number.

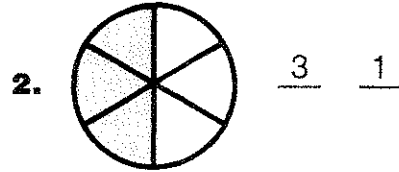
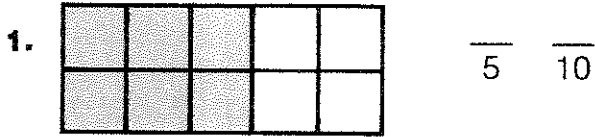
$$\frac{2}{3} = \frac{8}{12}$$

$\cdot 4$ (curved arrow from 2 to 8)
 $\cdot 4$ (curved arrow from 3 to 12)

$\frac{2}{3}$ and $\frac{8}{12}$ are equivalent fractions.

Exercises

Write two equivalent fractions for the shaded area in each picture.



Write two equivalent fractions for each fraction below.

3. $\frac{5}{8}$

4. $\frac{7}{10}$

5. $\frac{2}{3}$

6. $\frac{8}{9}$

7. $\frac{11}{12}$

8. $\frac{3}{14}$

Write the missing numbers.

9. $\frac{1}{7} = \frac{\quad}{21}$

10. $\frac{2}{3} = \frac{\quad}{24}$

11. $\frac{1}{4} = \frac{\quad}{16}$

12. $\frac{2}{5} = \frac{\quad}{30}$

13. $\frac{3}{7} = \frac{\quad}{42}$

14. $\frac{5}{6} = \frac{\quad}{54}$

15. $\frac{1}{3} = \frac{\quad}{12}$

16. $\frac{2}{3} = \frac{\quad}{12}$

17. $\frac{1}{6} = \frac{\quad}{36}$

18. $\frac{4}{5} = \frac{\quad}{100}$

19. $\frac{3}{8} = \frac{\quad}{72}$

20. $\frac{4}{7} = \frac{\quad}{63}$

Write the fraction that is not equivalent to the others.

21. $\frac{1}{2}, \frac{3}{5}, \frac{3}{6}$

22. $\frac{2}{8}, \frac{1}{4}, \frac{1}{2}$

23. $\frac{3}{5}, \frac{6}{10}, \frac{5}{3}$

24. $\frac{5}{9}, \frac{10}{18}, \frac{20}{27}$

Write an equivalent fraction using the given denominator for each fraction below.

25. $\frac{1}{2}$, denominator 8

26. $\frac{4}{7}$, denominator 21

27. $\frac{7}{9}$, denominator 36

28. $\frac{7}{3}$, denominator 18

29. $\frac{5}{4}$, denominator 12

30. $\frac{3}{5}$, denominator 25

31. $\frac{5}{3}$, denominator 36

32. $\frac{17}{2}$, denominator 40

Simplify Fractions

A fraction is in *simplest form* if the numerator and denominator have no common factor other than 1.

Express $\frac{12}{30}$ in simplest form.

THINK

1. Determine the GCF of the numerator and denominator.

The GCF of 12 and 30 is 6.

2. Divide the numerator and denominator by the GCF.

$$\frac{12}{30} = \frac{2}{5}$$

The diagram shows the fraction $\frac{12}{30}$ on the left and $\frac{2}{5}$ on the right, with an equals sign between them. Two curved arrows point from the left fraction to the right fraction. The top arrow is labeled with $\div 6$ and points from the numerator 12 to the numerator 2. The bottom arrow is also labeled with $\div 6$ and points from the denominator 30 to the denominator 5.

The simplest form of $\frac{12}{30}$ is $\frac{2}{5}$.

Express $\frac{12}{4}$ in simplest form.

1. The GCF of the numerator and denominator is 4.

2. Divide by the GCF.

$$\frac{12}{4} = \frac{3}{1}$$

The diagram shows the fraction $\frac{12}{4}$ on the left and $\frac{3}{1}$ on the right, with an equals sign between them. Two curved arrows point from the left fraction to the right fraction. The top arrow is labeled with $\div 4$ and points from the numerator 12 to the numerator 3. The bottom arrow is also labeled with $\div 4$ and points from the denominator 4 to the denominator 1.

The simplest form of $\frac{12}{4}$ is $\frac{3}{1}$.

Exercises

Tell whether each fraction is in simplest form.

1. $\frac{2}{4}$

2. $\frac{8}{3}$

3. $\frac{10}{2}$

4. $\frac{21}{28}$

5. $\frac{7}{3}$

6. $\frac{10}{15}$

Write each fraction in simplest form. Use the GCF.

7. $\frac{10}{12}$

8. $\frac{3}{9}$

9. $\frac{15}{20}$

10. $\frac{40}{35}$

11. $\frac{35}{40}$

12. $\frac{24}{30}$

13. $\frac{50}{60}$

14. $\frac{75}{100}$

15. $\frac{66}{33}$

16. $\frac{25}{90}$

17. $\frac{18}{40}$

18. $\frac{17}{17}$

Copy and complete.

19. $\frac{4}{12} = \frac{\quad}{3}$

20. $\frac{16}{6} = \frac{\quad}{3}$

21. $\frac{36}{24} = \frac{\quad}{12}$

22. $\frac{36}{24} = \frac{\quad}{2}$

23. $\frac{17}{34} = \frac{\quad}{2}$

24. $\frac{63}{7} = \frac{\quad}{1}$

25. $\frac{45}{15} = \frac{\quad}{3}$

26. $\frac{12}{15} = \frac{\quad}{5}$

27. $\frac{12}{18} = \frac{\quad}{9}$

28. $\frac{24}{8} = \frac{\quad}{1}$

29. $\frac{72}{96} = \frac{\quad}{8}$

30. $\frac{16}{90} = \frac{\quad}{45}$

31. $\frac{35}{90} = \frac{\quad}{18}$

32. $\frac{35}{35} = \frac{\quad}{1}$

33. $\frac{4}{16} = \frac{\quad}{4}$

34. $\frac{8}{64} = \frac{\quad}{16}$

35. Express $\frac{15}{60}$ as fourths

36. Express $\frac{12}{72}$ as sixths

37. Express $\frac{70}{105}$ as thirds

38. Express $\frac{60}{160}$ as eighths

Write the fractions in each row that equal the first fraction.

39. $\frac{2}{3}$ $\frac{24}{36}$ $\frac{16}{32}$ $\frac{30}{45}$ $\frac{25}{30}$ $\frac{6}{9}$

40. $\frac{7}{12}$ $\frac{21}{24}$ $\frac{21}{36}$ $\frac{63}{108}$ $\frac{25}{50}$ $\frac{14}{24}$

41. $\frac{13}{15}$ $\frac{39}{45}$ $\frac{52}{60}$ $\frac{26}{32}$ $\frac{65}{75}$ $\frac{39}{48}$

Compare Fractions

Brand A plant food is $\frac{2}{3}$ water.

Brand B plant food is $\frac{3}{5}$ water.

Which plant food contains more water?



THINK

Compare $\frac{2}{3}$ and $\frac{3}{5}$.

1. Find a common denominator.

2. Use the common denominator to write equivalent fractions.

3. Compare the numerators.

15 is a common multiple of 3 and 5.

$$\frac{2}{3} = \frac{10}{15}$$

(Multiplication factors: $\cdot 5$ on top, $\cdot 5$ on bottom)

$$\frac{3}{5} = \frac{9}{15}$$

(Multiplication factors: $\cdot 3$ on top, $\cdot 3$ on bottom)

$$10 > 9$$

So, $\frac{10}{15} > \frac{9}{15}$

and $\frac{2}{3} > \frac{3}{5}$

$\frac{2}{3} > \frac{3}{5}$. Brand A contains more water.

Compare $2\frac{3}{8}$ and $2\frac{1}{2}$.

● Compare the whole number parts.

$$2 = 2$$

● If the whole number parts are equal, compare the fractional parts.

$$\frac{3}{8} \text{ and } \frac{1}{2} = \frac{4}{8}$$

(Multiplication factors: $\cdot 4$ on top, $\cdot 4$ on bottom)

8 is a common denominator.

$$\frac{3}{8} < \frac{4}{8} \text{ So, } 2\frac{3}{8} < 2\frac{1}{2}.$$

Exercises

Replace \bullet with $<$, $>$, or $=$.

1. $\frac{3}{8} \bullet \frac{4}{8}$ 2. $\frac{6}{10} \bullet \frac{6}{9}$ 3. $\frac{4}{5} \bullet \frac{8}{10}$ 4. $\frac{14}{3} \bullet \frac{28}{4}$ 5. $\frac{21}{28} \bullet \frac{13}{14}$
6. $\frac{7}{3} \bullet \frac{21}{10}$ 7. $\frac{18}{5} \bullet \frac{17}{5}$ 8. $\frac{6}{10} \bullet \frac{3}{5}$ 9. $\frac{8}{4} \bullet \frac{9}{3}$ 10. $\frac{15}{20} \bullet \frac{3}{4}$
11. $\frac{7}{5} \bullet \frac{10}{5}$ 12. $\frac{18}{4} \bullet \frac{9}{2}$ 13. $\frac{20}{7} \bullet \frac{21}{7}$ 14. $\frac{35}{70} \bullet \frac{36}{70}$ 15. $\frac{5}{8} \bullet \frac{6}{9}$
16. $1\frac{1}{4} \bullet 1\frac{2}{8}$ 17. $3\frac{2}{9} \bullet 3\frac{1}{6}$ 18. $4\frac{9}{10} \bullet 5\frac{1}{10}$ 19. $6\frac{1}{5} \bullet 2\frac{2}{3}$

Write the fractions in order from least to greatest.

20. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$ 21. $\frac{1}{3}, \frac{1}{27}, \frac{1}{9}$ 22. $\frac{2}{5}, \frac{2}{7}, \frac{2}{9}$ 23. $\frac{1}{3}, \frac{2}{3}, \frac{3}{3}$
24. $\frac{3}{4}, \frac{10}{12}, \frac{2}{3}$ 25. $\frac{5}{7}, \frac{10}{21}, \frac{6}{7}$ 26. $\frac{4}{6}, \frac{3}{6}, \frac{6}{6}$ 27. $\frac{1}{2}, \frac{5}{6}, \frac{2}{3}$

Solve.

28. In a recent election, one candidate received $\frac{3}{8}$ of all the votes. Another candidate received $\frac{7}{16}$ of all the votes. Which fraction shows the greater number of votes?
29. Linda runs $2\frac{2}{3}$ miles every day. Patricia runs $2\frac{7}{10}$ miles. Who runs the greater distance?

Add and Subtract Fractions

Use a common denominator when you add or subtract fractions with different denominators.

The *least common denominator* (LCD) is the least common multiple of the denominators.



Find $\frac{1}{3} + \frac{5}{8}$.

THINK

1. Find the LCD.

$$\begin{array}{r} \frac{1}{3} = \frac{8}{24} \\ + \frac{5}{8} = \frac{15}{24} \\ \hline \end{array}$$

2. Write equivalent fractions.

$$\begin{array}{r} \frac{1}{3} = \frac{8}{24} \\ + \frac{5}{8} = \frac{15}{24} \\ \hline \end{array}$$

3. Add.

$$\begin{array}{r} \frac{8}{24} \\ + \frac{15}{24} \\ \hline \frac{23}{24} \end{array}$$

1. Find the LCD.

$$\begin{array}{r} \frac{4}{7} = \frac{20}{35} \\ - \frac{2}{5} = \frac{14}{35} \\ \hline \end{array}$$

2. Write equivalent fractions.

$$\begin{array}{r} \frac{4}{7} = \frac{20}{35} \\ - \frac{2}{5} = \frac{14}{35} \\ \hline \end{array}$$

3. Subtract.

$$\begin{array}{r} \frac{20}{35} \\ - \frac{14}{35} \\ \hline \frac{6}{35} \end{array}$$

Exercises

Add or subtract. Write each answer in simplest form.

$$\begin{array}{r} 1. \quad \frac{1}{2} \\ + \frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad \frac{5}{8} \\ - \frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad \frac{3}{8} \\ + \frac{1}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad \frac{2}{3} \\ - \frac{1}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad \frac{3}{5} \\ - \frac{1}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad \frac{7}{10} \\ + \frac{1}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad \frac{3}{5} \\ + \frac{1}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad \frac{3}{5} \\ - \frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad \frac{7}{8} \\ - \frac{1}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad \frac{1}{8} \\ + \frac{5}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 11. \quad \frac{1}{5} \\ + \frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad \frac{2}{3} \\ - \frac{16}{24} \\ \hline \end{array}$$

$$13. \quad \left(\frac{1}{2} + \frac{1}{4}\right) + \frac{1}{8} \quad 14. \quad \frac{1}{3} + \left(\frac{1}{9} + \frac{1}{27}\right) \quad 15. \quad \left(\frac{1}{2} + \frac{1}{3}\right) + \frac{1}{4} \quad 16. \quad \frac{1}{2} + \left(\frac{3}{4} - \frac{2}{3}\right)$$

Solve.

17. Anju started with $\frac{7}{8}$ can of blue paint. She has $\frac{1}{3}$ can

left. How much did she use?

18. Mike mixed $\frac{1}{2}$ can of white paint with $\frac{2}{5}$ can of green paint. How much of the mixture does he have?

19. A container of solvent is $\frac{9}{10}$ full. The painters used some of the solvent to clean their brushes. Now the container is $\frac{2}{5}$ full. How much solvent did the painters use?

20. Mrs. Blake painted the closet door in $\frac{1}{6}$ of an hour and the kitchen doors in $\frac{2}{3}$ of an hour. How long did it take to paint the closet door and the kitchen doors?

Fractions and Mixed Numbers

On Thursday, Joel collected 1 case of bottles.

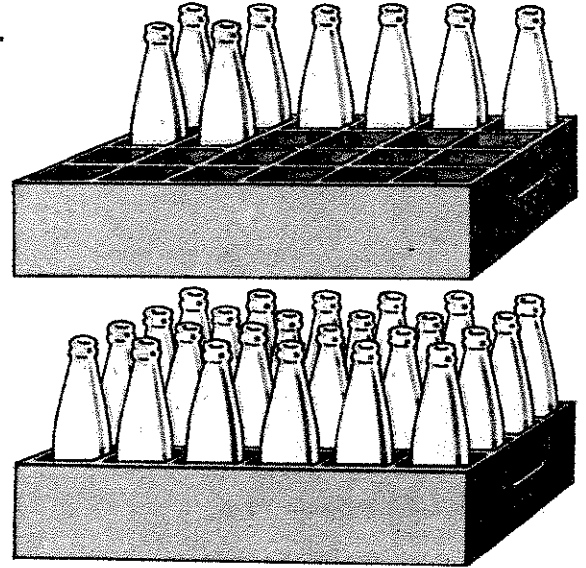
On Friday, he collected $\frac{1}{3}$ of a case.

How many cases did he collect?

You can write the amount as a *mixed number*. $1 + \frac{1}{3} = 1\frac{1}{3}$

You can also write it as a fraction.

$$\frac{24}{24} + \frac{8}{24} = \frac{32}{24}$$



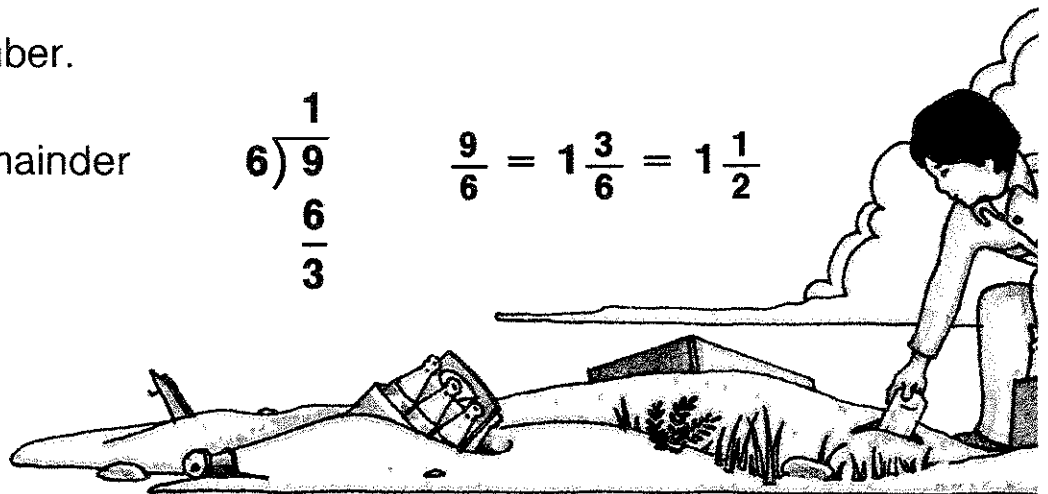
THINK

Write $\frac{9}{6}$ as a mixed number.

- Divide. Write the remainder as a fraction.

$$\begin{array}{r} 1 \\ 6 \overline{)9} \\ \underline{6} \\ 3 \end{array}$$

$$\frac{9}{6} = 1\frac{3}{6} = 1\frac{1}{2}$$



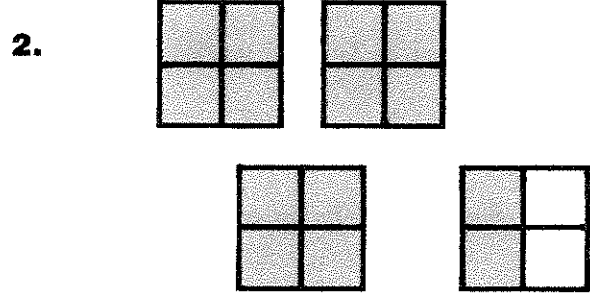
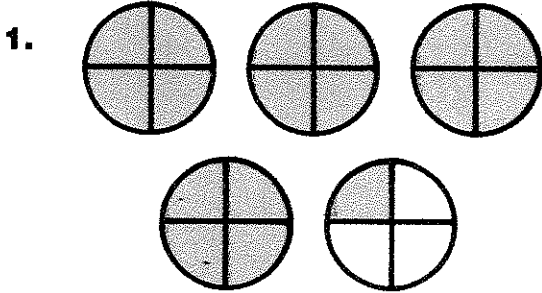
Write $1\frac{5}{8}$ as a fraction.

- Write the whole number as a fraction. Add.

$$\begin{aligned} 1\frac{5}{8} &= 1 + \frac{5}{8} \\ &= \frac{8}{8} + \frac{5}{8} \\ &= \frac{13}{8} \end{aligned}$$

Exercises

Write a mixed number for each picture.



Write each fraction as a whole number or as a mixed number.

3. $\frac{21}{4}$

4. $\frac{36}{18}$

5. $\frac{15}{9}$

6. $\frac{42}{8}$

7. $\frac{36}{6}$

8. $\frac{6}{6}$

9. $\frac{61}{10}$

10. $\frac{61}{12}$

11. $\frac{100}{3}$

12. $\frac{100}{25}$

13. $\frac{20}{12}$

14. $\frac{6}{5}$

Write each mixed number as a fraction.

15. $4\frac{2}{5}$

16. $7\frac{4}{9}$

17. $2\frac{1}{6}$

18. $9\frac{5}{8}$

19. $3\frac{2}{10}$

20. $8\frac{1}{2}$

21. $3\frac{3}{6}$

22. $1\frac{4}{5}$

23. $7\frac{8}{9}$

24. $4\frac{1}{4}$

25. $7\frac{1}{3}$

26. $5\frac{2}{3}$

27. $12\frac{1}{5}$

28. $19\frac{3}{7}$

29. $14\frac{9}{10}$

30. $11\frac{11}{12}$

31. $52\frac{14}{15}$

32. $18\frac{3}{8}$

Solve.

33. A shelf holds 49 bottles. How many shelves will 56 bottles fill?

34. Danny has 47 empty juice cans. He stores them in cases that hold 12 cans each. How many cases does he have?

Add Mixed Numbers

Workers loaded a truck with lumber in $3\frac{1}{2}$ hours. They loaded a second truck in $2\frac{2}{3}$ hours. How long did it take to load the trucks?

THINK

Find $3\frac{1}{2} + 2\frac{2}{3}$.

1. Rename the fractions with the LCD.

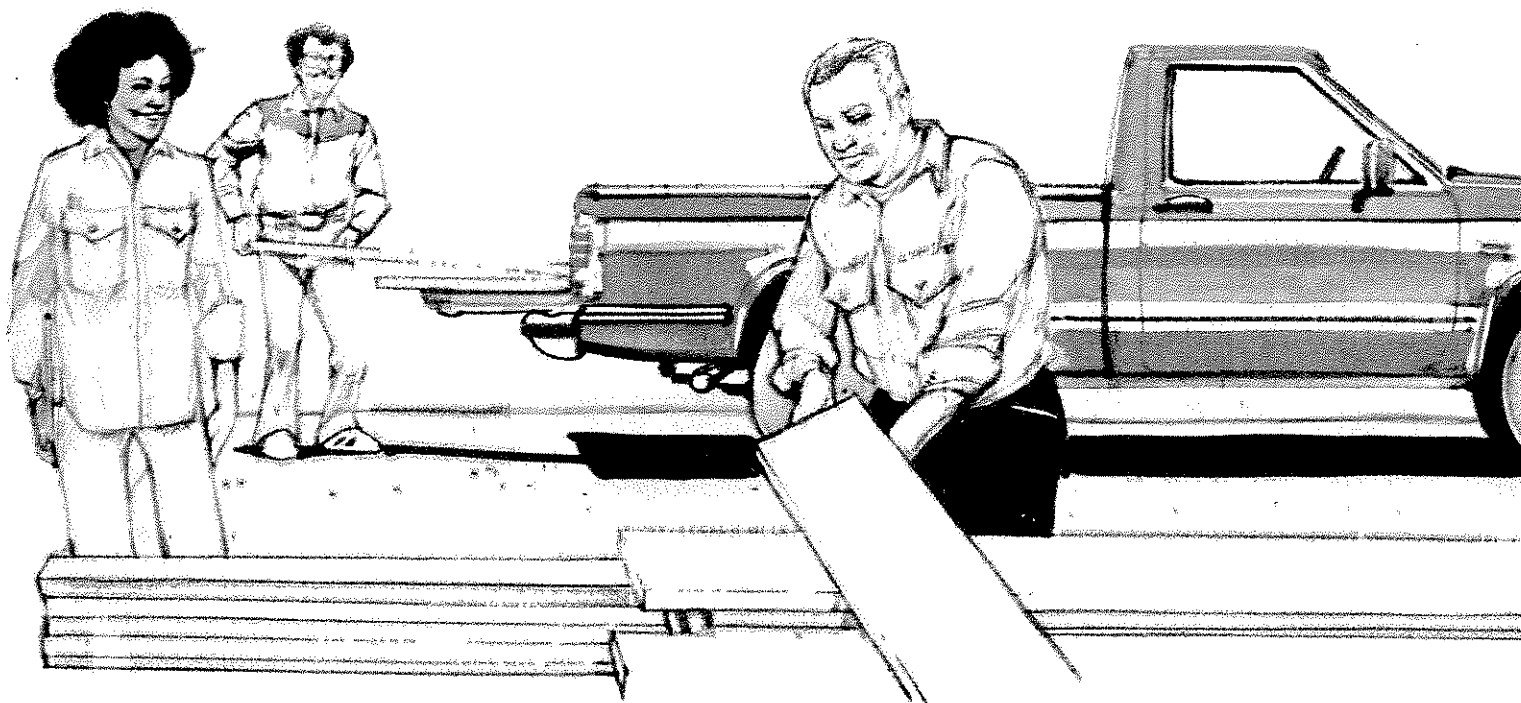
$$\begin{array}{r} 3\frac{1}{2} = 3\frac{3}{6} \\ + 2\frac{2}{3} = 2\frac{4}{6} \\ \hline \end{array}$$

2. Add the fractions, then add the whole numbers.

$$\begin{array}{r} 3\frac{3}{6} \\ + 2\frac{4}{6} \\ \hline 5\frac{7}{6} = 6\frac{1}{6} \end{array}$$

(Note: A cloud-shaped callout next to the second step shows $5 + 1\frac{1}{6}$)

It took $6\frac{1}{6}$ hours to load the truck.



Exercises

Add.

1. $6\frac{5}{8} + 2\frac{1}{4}$ 2. $5\frac{3}{8} + \frac{1}{5}$ 3. $1\frac{1}{4} + 5$ 4. $2\frac{3}{5} + 2\frac{2}{5}$
5. $4\frac{3}{4} + 4\frac{3}{4}$ 6. $8\frac{1}{3} + 2\frac{4}{9}$ 7. $7\frac{1}{5} + 6$ 8. $10 + 1\frac{1}{3}$
9. $8\frac{2}{3} + \frac{4}{6}$ 10. $3\frac{3}{4} + 10\frac{2}{3}$ 11. $1\frac{1}{2} + 3\frac{1}{5}$ 12. $6\frac{2}{3} + 3\frac{2}{6}$
13. $8\frac{1}{4} + 8\frac{1}{4}$ 14. $5\frac{7}{10} + \frac{3}{8}$ 15. $5\frac{1}{4} + 4\frac{2}{3}$ 16. $3\frac{3}{5} + 3\frac{3}{4}$
17. $4\frac{3}{5} + \frac{1}{10}$ 18. $4\frac{3}{8} + \frac{5}{9}$ 19. $3\frac{5}{6} + 1\frac{2}{3}$ 20. $1\frac{5}{6} + 1\frac{2}{8}$
21. $2\frac{1}{3} + 2\frac{3}{6} + 2\frac{5}{6}$ 22. $3\frac{3}{7} + 4\frac{1}{7} + 2\frac{3}{14}$ 23. $1\frac{5}{6} + 2\frac{2}{6} + 6\frac{3}{24}$
24. $1 + 1\frac{1}{2} + 2$ 25. $1 + 1\frac{1}{4} + 1\frac{1}{2}$ 26. $1 + 1\frac{1}{3} + 1\frac{1}{9}$

Solve.

27. Max loaded $4\frac{1}{4}$ bundles on a truck. Carlos loaded $5\frac{1}{2}$ bundles. How many bundles did they load altogether?
28. A crew loaded two trucks in $1\frac{1}{4}$ and $\frac{5}{6}$ hours. How long did it take to load the trucks?
29. The crew unloaded one truck in $1\frac{1}{4}$ and the other truck in $1\frac{1}{5}$ hours. How long did it take to unload both trucks?
30. It takes $1\frac{1}{4}$ hours to load, $\frac{1}{3}$ of an hour to drive, and $\frac{5}{6}$ of an hour to unload a truck. How much time does it take altogether?
31. Eleanor ordered $4\frac{2}{3}$ truckloads of sawdust for her barn on Monday. She ordered another $2\frac{1}{2}$ loads on Thursday. How many loads did she order for the two days?
32. Eleanor repaired the corral fence. She used $9\frac{3}{10}$ meters on one side and $5\frac{9}{10}$ meters on the other side. How much fencing did she use altogether?

Subtract Mixed Numbers

Miller Construction Company is building 6 houses. They completed the frames of $2\frac{1}{3}$ houses in one week. How many frames remain to be built?

THINK

Find $6 - 2\frac{1}{3}$.

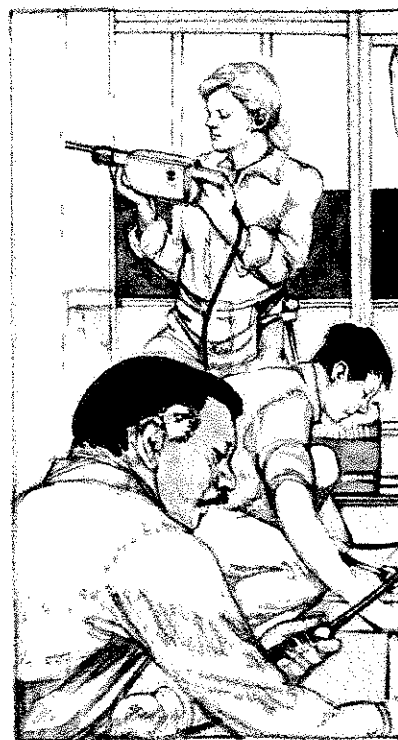
1. Rename 6.

$$6 = 5\frac{3}{3}$$

$$6 = 5 + \frac{3}{3}$$

2. Subtract.

$$\begin{array}{r} 5\frac{3}{3} \\ - 2\frac{1}{3} \\ \hline 3\frac{2}{3} \end{array}$$



$3\frac{2}{3}$ frames remain to be built.

The weather was stormy in February. The company was able to complete only $\frac{5}{6}$ of a frame. How many frames still need to be built?

Find $3\frac{2}{3} - \frac{5}{6}$.

1. Find equivalent fractions.

$$\begin{array}{r} 3\frac{2}{3} = 3\frac{4}{6} \\ - \frac{5}{6} \\ \hline \end{array}$$

2. Rename $3\frac{4}{6}$.

$$3\frac{4}{6} = 2\frac{10}{6}$$

3. Subtract.

$$\begin{array}{r} 2\frac{10}{6} \\ - \frac{5}{6} \\ \hline 2\frac{5}{6} \end{array}$$

$2\frac{5}{6}$ frames still need to be built.

Exercises

Subtract.

1. $5\frac{1}{2} - \frac{2}{3}$ 2. $4\frac{3}{4} - 1\frac{1}{3}$ 3. $10\frac{3}{10} - 8\frac{1}{2}$ 4. $4\frac{2}{3} - \frac{5}{6}$ 5. $6\frac{3}{5} - 3\frac{3}{4}$
6. $6\frac{5}{8} - 2\frac{9}{10}$ 7. $1\frac{4}{5} - \frac{9}{10}$ 8. $3\frac{1}{2} - \frac{3}{4}$ 9. $2\frac{1}{2} - 1$ 10. $4\frac{3}{5} - 1\frac{7}{8}$
11. $6 - 2\frac{1}{2}$ 12. $7 - 1\frac{1}{8}$ 13. $17 - 3\frac{3}{4}$ 14. $9 - 3\frac{3}{8}$ 15. $8\frac{1}{3} - 3\frac{1}{2}$

Solve.

16. 100 bundles of insulation were delivered to the building site. Only $82\frac{3}{4}$ bundles were used. How many were left over?
17. $15\frac{1}{4}$ wood panels are needed to finish one basement. May used $5\frac{1}{2}$ panels. How many panels are left?
18. The mason cemented the bricks in the front wall of the house in $2\frac{2}{3}$ hours. He cemented those in the back wall in $3\frac{1}{6}$ hours. How long did it take to cement both walls?
19. The builder estimated that $95\frac{1}{2}$ bundles of shingles were needed. $112\frac{3}{5}$ bundles were actually required. By how many bundles did he underestimate?
20. Chris wired $6\frac{3}{7}$ rooms in one house. Marilyn wired $6\frac{2}{5}$ rooms. Who did more wiring? How much more?
21. The mason worked $8\frac{4}{10}$ hours. The electrician worked $4\frac{5}{6}$ hours. How much longer did the mason work?

Check Up

Write the greatest common factor and least common multiple of each pair.

1. 15 and 25

2. 16 and 40

3. 16 and 17

4. 7 and 49

Write the missing numbers.

5. $\frac{5}{8} = \frac{\square}{16}$

6. $\frac{3}{4} = \frac{\square}{28}$

7. $\frac{2}{3} = \frac{\square}{24}$

8. $\frac{4}{5} = \frac{\square}{30}$

Write each fraction in simplest form.

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

10. $\frac{18}{24}$

11. $\frac{8}{32}$

12. $\frac{10}{24}$

Replace \bullet with $<$, $>$, or $=$.

13. $\frac{5}{8} \bullet \frac{3}{4}$

14. $\frac{2}{3} \bullet \frac{3}{4}$

15. $\frac{5}{6} \bullet \frac{7}{8}$

16. $\frac{3}{7} \bullet \frac{6}{13}$

Write each mixed number as a fraction. Write each fraction as a whole number or as a mixed number in simplest form.

17. $\frac{7}{6}$

18. $2\frac{1}{2}$

19. $\frac{24}{6}$

20. $\frac{20}{16}$

21. $3\frac{3}{5}$

22. $4\frac{7}{8}$

Add or subtract. Give each answer in simplest form.

23.
$$\begin{array}{r} \frac{1}{2} \\ + \frac{1}{3} \\ \hline \end{array}$$

24.
$$\begin{array}{r} \frac{5}{8} \\ - \frac{1}{2} \\ \hline \end{array}$$

25.
$$\begin{array}{r} \frac{3}{4} \\ + \frac{1}{3} \\ \hline \end{array}$$

26.
$$\begin{array}{r} \frac{7}{9} \\ - \frac{1}{6} \\ \hline \end{array}$$

27.
$$\begin{array}{r} 3\frac{1}{3} \\ - 2\frac{1}{4} \\ \hline \end{array}$$

28.
$$\begin{array}{r} 4\frac{1}{3} \\ - 2\frac{1}{5} \\ \hline \end{array}$$

29. $2\frac{1}{2} + 5$

30. $4\frac{1}{3} - 2\frac{1}{2}$

31. $10 - 2\frac{1}{3}$

32. $5\frac{3}{4} + 2\frac{1}{8}$

Read the problem. If there is too little information, tell what information is needed. If there is too much information, tell what information is not needed and solve.

33. Bill bought 4 bags of charcoal each weighing 10 lbs. He used $1\frac{1}{4}$ bags. How many bags are left?

34. Each person at Lorna's party had 2 glasses of punch. How many glasses did they drink in all?

Find the greatest common factor of 6 and 9.

List the factors of each.

Factors of 6: 1, 2, 3, 6

Factors of 9: 1, 3, 9

List the common factors.

1, 3

The GCF is 3.

Find the GCF of each pair.

- | | |
|--------------|---------------|
| 1. 9 and 12 | 2. 12 and 20 |
| 3. 10 and 30 | 4. 4 and 16 |
| 5. 4 and 20 | 6. 20 and 30 |
| 7. 25 and 40 | 8. 16 and 26 |
| 9. 15 and 30 | 10. 12 and 18 |

Find the least common multiple of 6 and 9.

List the multiples of 9 until you find the first multiple that is also a multiple of 6.

$9 \cdot 2 = 18$ 18 is a common multiple since it is also a multiple of 6.

The LCM is 18.

Find the LCM of each pair.

- | | |
|---------------|---------------|
| 1. 9 and 12 | 2. 12 and 20 |
| 3. 10 and 30 | 4. 4 and 16 |
| 5. 12 and 18 | 6. 16 and 24 |
| 7. 25 and 40 | 8. 16 and 32 |
| 9. 9 and 27 | 10. 30 and 50 |
| 11. 25 and 50 | 12. 36 and 16 |

Find a fraction equivalent to $\frac{2}{3}$ with denominator 12.

$$\frac{2}{3} = \frac{12}{12}$$

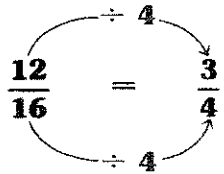
$$\frac{2}{3} = \frac{8}{12}$$

Find the missing numbers.

- | | |
|-------------------------------------|--------------------------------------|
| 1. $\frac{1}{4} = \frac{\quad}{32}$ | 2. $\frac{5}{8} = \frac{\quad}{40}$ |
| 3. $\frac{2}{3} = \frac{\quad}{18}$ | 4. $\frac{3}{4} = \frac{\quad}{24}$ |
| 5. $\frac{1}{2} = \frac{\quad}{20}$ | 6. $\frac{1}{2} = \frac{\quad}{18}$ |
| 7. $\frac{2}{5} = \frac{\quad}{25}$ | 8. $\frac{4}{5} = \frac{\quad}{10}$ |
| 9. $\frac{2}{5} = \frac{\quad}{15}$ | 10. $\frac{7}{8} = \frac{\quad}{16}$ |

Write $\frac{12}{16}$ in simplest form.

The GCF of 12 and 16 is 4.



Write each fraction in simplest form.

- | | | | |
|--------------------|--------------------|-------------------|--------------------|
| 1. $\frac{15}{20}$ | 2. $\frac{9}{12}$ | 3. $\frac{9}{18}$ | 4. $\frac{4}{8}$ |
| 5. $\frac{10}{32}$ | 6. $\frac{12}{36}$ | 7. $\frac{8}{10}$ | 8. $\frac{12}{18}$ |

Write $4\frac{2}{3}$ as a fraction.

$$4\frac{2}{3} = \frac{12}{3} + \frac{2}{3} = \frac{14}{3}$$

Write each mixed number as a fraction.

- | | | | |
|-------------------|-------------------|-------------------|-------------------|
| 1. $2\frac{3}{4}$ | 2. $3\frac{3}{4}$ | 3. $1\frac{7}{8}$ | 4. $6\frac{1}{5}$ |
| 5. $6\frac{3}{4}$ | 6. $4\frac{3}{5}$ | 7. $2\frac{1}{3}$ | 8. $8\frac{1}{2}$ |

Write $\frac{11}{4}$ as a mixed number.

$$\begin{array}{r} 2 \\ 4 \overline{)11} \\ \underline{8} \\ 3 \end{array} \quad \frac{11}{4} = 2\frac{3}{4}$$

Write each fraction as a mixed number or a whole number.

- | | | | |
|-------------------|--------------------|--------------------|--------------------|
| 9. $\frac{12}{5}$ | 10. $\frac{25}{7}$ | 11. $\frac{17}{6}$ | 12. $\frac{18}{6}$ |
|-------------------|--------------------|--------------------|--------------------|

Add or subtract.

Find $\frac{2}{3} + \frac{1}{4}$.

Find the LCD and add.

$$\begin{array}{r} \frac{2}{3} \\ + \frac{1}{4} \\ \hline \end{array} \quad \begin{array}{r} \frac{8}{12} \\ + \frac{3}{12} \\ \hline \frac{11}{12} \end{array}$$

The LCD is 12.

- | | | | |
|--------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 1. $\frac{1}{3} + \frac{1}{6}$ | 2. $\frac{5}{6} - \frac{1}{3}$ | 3. $\frac{3}{10} + \frac{1}{2}$ | 4. $\frac{1}{10} + \frac{1}{3}$ |
| 5. $\frac{5}{8} - \frac{1}{3}$ | 6. $\frac{5}{8} - \frac{3}{5}$ | 7. $\frac{7}{12} + \frac{1}{4}$ | 8. $\frac{3}{5} - \frac{1}{2}$ |
| 9. $\frac{1}{2} + \frac{3}{5}$ | 10. $\frac{7}{8} - \frac{3}{4}$ | | |

Find $2\frac{3}{4} + 3\frac{2}{3}$.

Find the LCD and add.

$$\begin{array}{r} 2\frac{3}{4} \\ + 3\frac{2}{3} \\ \hline \end{array} \quad \begin{array}{r} 2\frac{9}{12} \\ + 3\frac{8}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 5\frac{17}{12} \\ = 6\frac{5}{12} \end{array}$$

$5 + 1\frac{5}{12}$

Add.

$$\begin{array}{r} 1. \quad 8\frac{4}{5} \\ + 5\frac{3}{10} \\ \hline \end{array} \quad \begin{array}{r} 2. \quad 6\frac{5}{6} \\ + 2\frac{1}{2} \\ \hline \end{array} \quad \begin{array}{r} 3. \quad 4\frac{7}{8} \\ + 6\frac{5}{6} \\ \hline \end{array} \quad \begin{array}{r} 4. \quad 8\frac{2}{3} \\ + 8\frac{1}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 4\frac{5}{9} \\ + 6\frac{1}{3} \\ \hline \end{array} \quad \begin{array}{r} 6. \quad 10\frac{7}{8} \\ + 3\frac{5}{6} \\ \hline \end{array} \quad \begin{array}{r} 7. \quad \frac{11}{12} \\ + 4\frac{1}{6} \\ \hline \end{array} \quad \begin{array}{r} 8. \quad 6\frac{8}{13} \\ + 2\frac{8}{26} \\ \hline \end{array}$$

9. $1\frac{3}{4} + 2\frac{3}{5} + 1\frac{1}{10}$

10. $11\frac{1}{2} + 12\frac{1}{2} + 1\frac{1}{4}$

Find $10 - 1\frac{2}{3}$.

Rename 10 and subtract.

$$\begin{array}{r} 10 \\ - 1\frac{2}{3} \\ \hline \end{array} \quad \begin{array}{r} 9\frac{3}{3} \\ - 1\frac{2}{3} \\ \hline 8\frac{1}{3} \end{array}$$

Subtract.

$$\begin{array}{r} 1. \quad 6 \\ - 3\frac{4}{9} \\ \hline \end{array} \quad \begin{array}{r} 2. \quad 11 \\ - 7\frac{4}{5} \\ \hline \end{array} \quad \begin{array}{r} 3. \quad 10 \\ - 4\frac{2}{3} \\ \hline \end{array} \quad \begin{array}{r} 4. \quad 13 \\ - 7\frac{2}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 8 \\ - 5\frac{7}{10} \\ \hline \end{array} \quad \begin{array}{r} 6. \quad 2 \\ - 1\frac{1}{4} \\ \hline \end{array} \quad \begin{array}{r} 7. \quad 8 \\ - 3\frac{4}{9} \\ \hline \end{array} \quad \begin{array}{r} 8. \quad 9 \\ - 3\frac{4}{10} \\ \hline \end{array}$$

Find $7\frac{1}{8} - 2\frac{1}{4}$.

Find the LCD, then
rename $7\frac{1}{8}$.

$$\begin{array}{r} 7\frac{1}{8} = 7\frac{1}{8} \\ - 2\frac{1}{4} = 2\frac{2}{8} \\ \hline \end{array} \quad \begin{array}{r} 6\frac{9}{8} \\ - 2\frac{2}{8} \\ \hline 4\frac{7}{8} \end{array}$$

Subtract.

$$\begin{array}{r} 1. \quad 1\frac{7}{12} \\ - \frac{2}{3} \\ \hline \end{array} \quad \begin{array}{r} 2. \quad 9\frac{2}{7} \\ - 1\frac{3}{4} \\ \hline \end{array} \quad \begin{array}{r} 3. \quad 10\frac{2}{3} \\ - 6\frac{3}{4} \\ \hline \end{array} \quad \begin{array}{r} 4. \quad 6\frac{1}{3} \\ - 2\frac{5}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 8\frac{1}{5} \\ - 6\frac{9}{10} \\ \hline \end{array} \quad \begin{array}{r} 6. \quad 12\frac{1}{4} \\ - 2\frac{2}{3} \\ \hline \end{array} \quad \begin{array}{r} 7. \quad 18\frac{8}{9} \\ - 9\frac{9}{10} \\ \hline \end{array} \quad \begin{array}{r} 8. \quad 11\frac{3}{8} \\ - 9\frac{11}{16} \\ \hline \end{array}$$