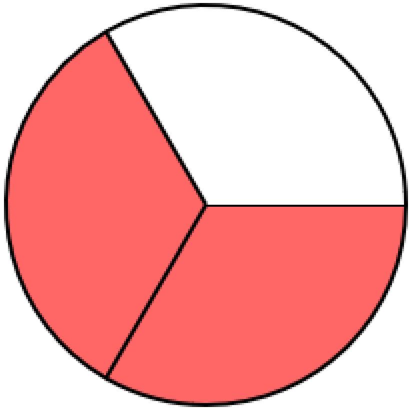
How to Identify Fractions

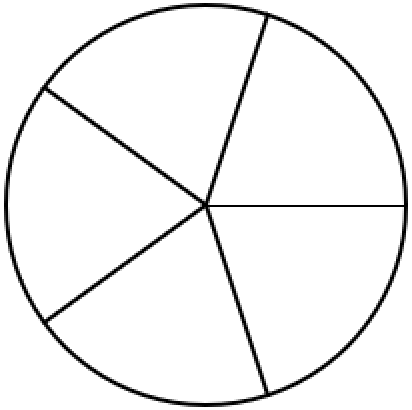
- Introducing:

- whole number
- numerator
- fraction bar
- denominator



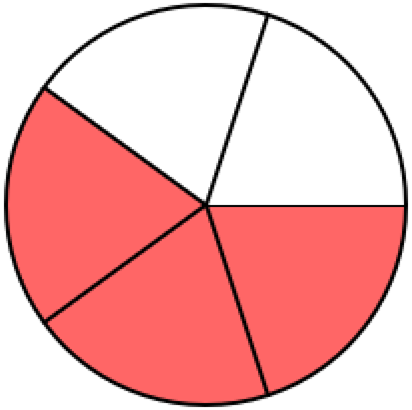
$\frac{2}{3}$ of the circle is shaded.

Identify Fractions 1



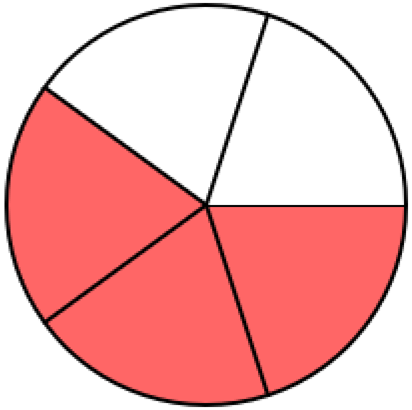
This unit has 5 equal parts.

Identify Fractions 2



Three of the parts are selected (shaded).

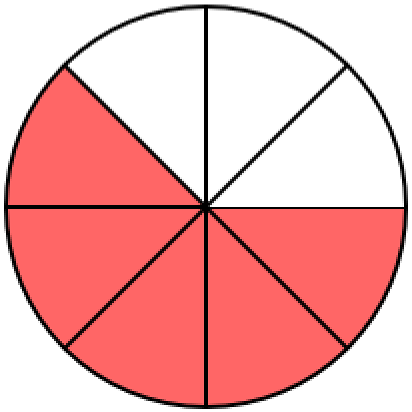
Identify Fractions 3



$\frac{3}{5}$ of the circle is shaded.

The *denominator* 5 tells us that there are 5 equal parts in the unit. The *numerator* 3 tells us that 3 of the equal parts are selected (shaded). The fraction $^{3}/_{5}$ can be written as three-fifths.

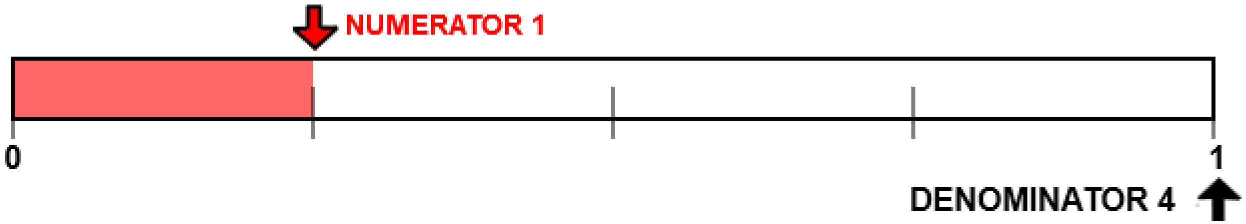
Identify Fractions 4



$\frac{5}{8}$ of the circle is shaded.

There are 8 equal parts in this unit, giving a *denominator* of 8. Five of the parts are selected, giving a *numerator* of 5. This fraction can be written as five-eighths.

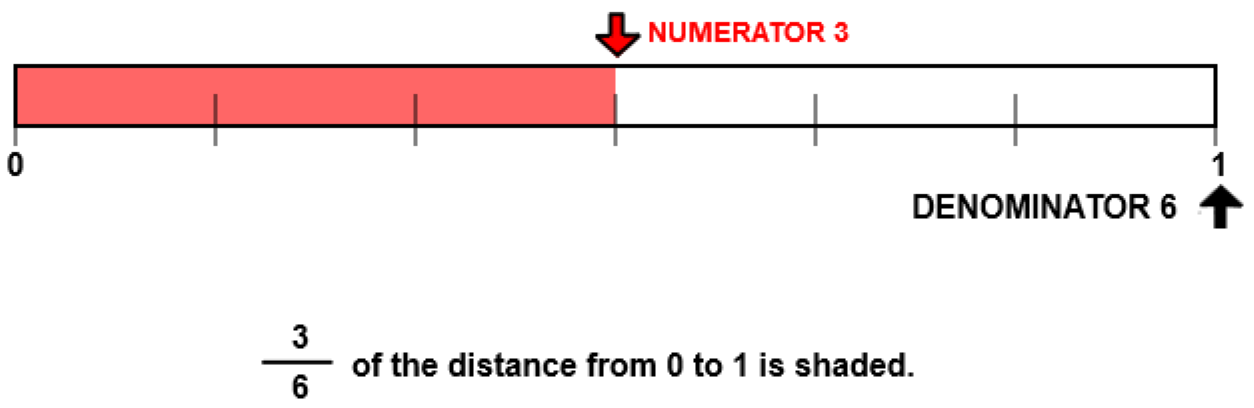
Identify Fractions 5



$\frac{1}{4}$ of the distance from 0 to 1 is shaded.

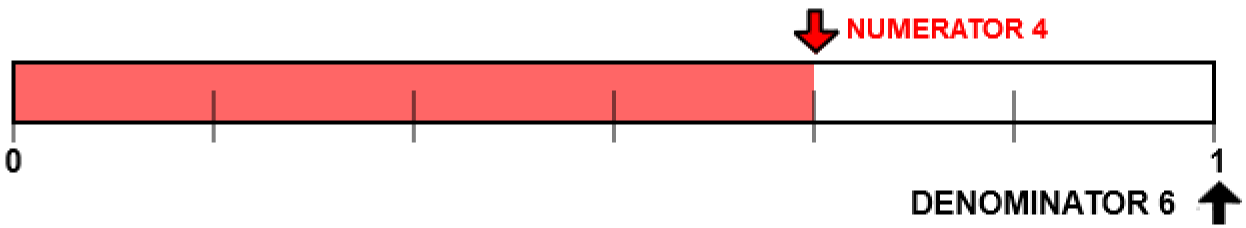
The *denominator* 4 shows that the distance from 0 to 1 is divided into 4 equal parts. The *numerator* 1 shows that 1 of the parts is selected. The fraction $^1/_4$ can be written as one-fourth.

Identify Fractions 6



The *denominator* 6 in the fraction $^3/_6$ shows that the distance from 0 to 1 is divided into 6 equal parts. The *numerator* 3 shows that 3 of the 6 parts are selected. The fraction $^3/_6$ can be written as three-sixths.

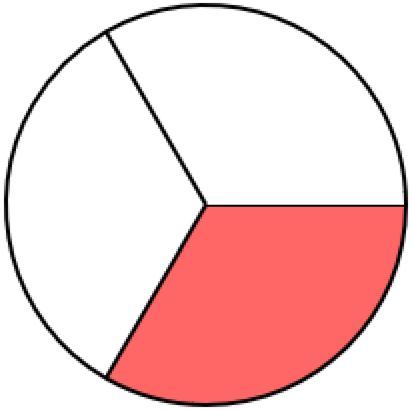
Identify Fractions 7



$\frac{4}{6}$ of the distance from 0 to 1 is shaded.

The *numerator* 4 shows that 4 of the 6 parts are selected. Compare this to $^{3}/_{6}$ in the previous slide. Notice the fraction increases in size as the *numerator* increases.

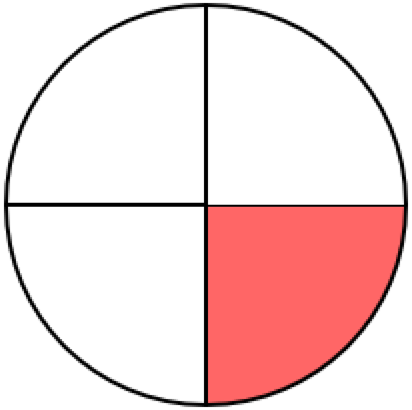
Identify Fractions 8



$\frac{1}{3}$ of the circle is shaded.

The fraction $^1/_3$ has a denominator of 3, which shows the circle has three equal parts.

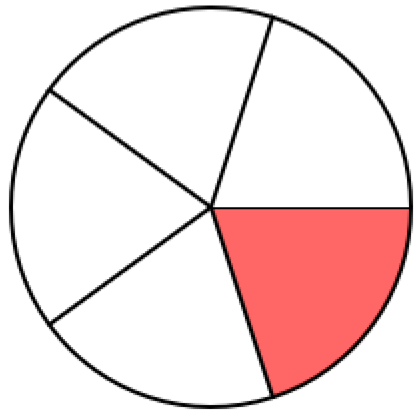
Identify Fractions 9



$\frac{1}{4}$ of the circle is shaded.

The *denominator* has been increased to 4. Notice the fraction has decreased in size compared to the previous slide.

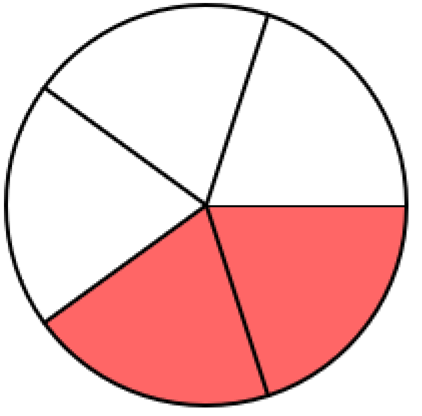
Identify Fractions 10



$\frac{1}{5}$ of the circle is shaded.

The *denominator* has been increased to 5. As the *denominator* increases, the fraction size decreases.

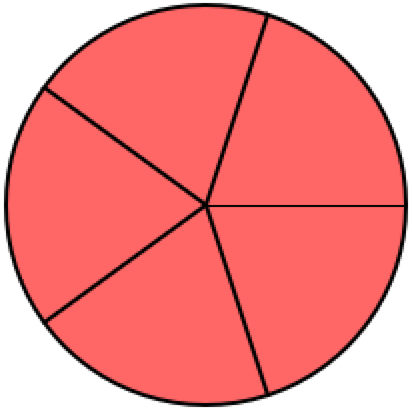
Identify Fractions 11



$\frac{2}{5}$ of the circle is shaded.

Increasing the numerator to 2 increases the fraction size.

Identify Fractions 12

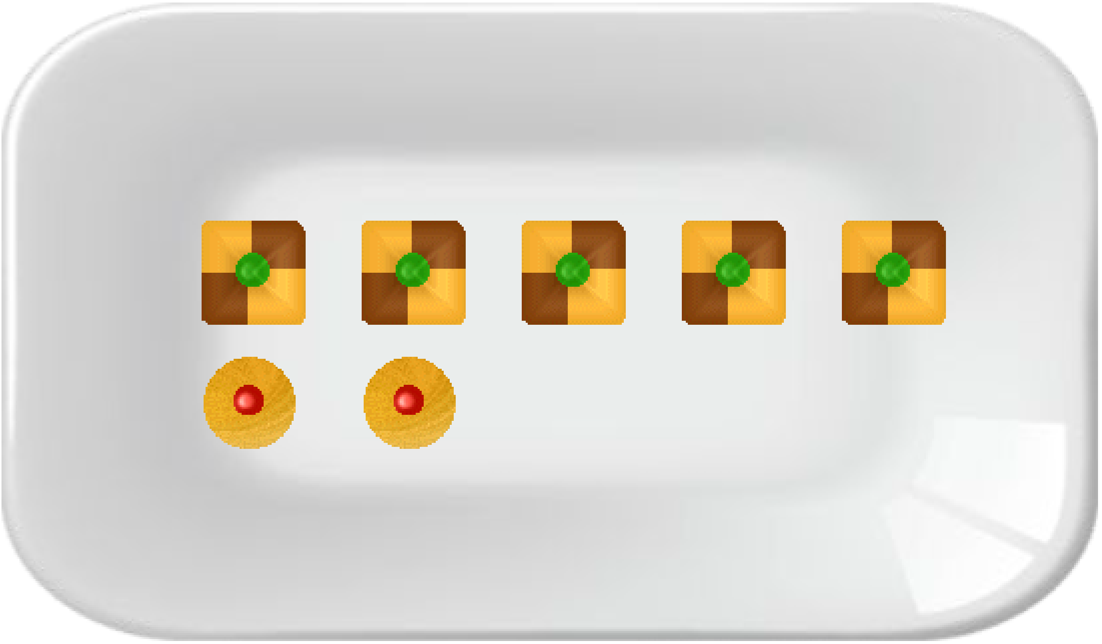


$\frac{5}{5}$ of the circle is shaded.

The *numerator* increases to 5 and the fraction increases to a complete unit. The fraction $^{5}/_{5}$ is equal to *whole number* 1

Identify Fractions 13

$^{5}/_{7}$ Of the cookies are square.

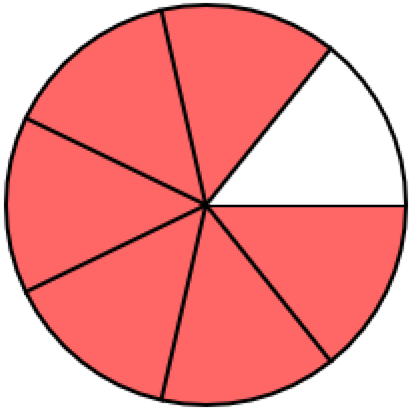


The numerator is 5 because 5 of the cookies are square.

The denominator is 7 because there are 7 coookies in all.

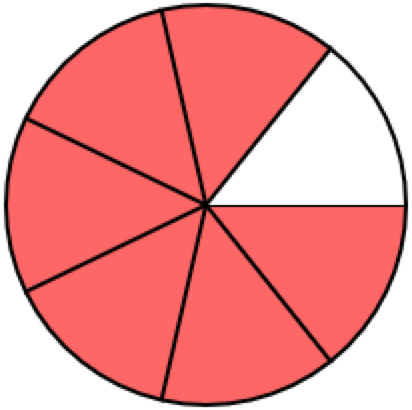
The picture shows a tray of 7 cookies. Five of the 7 cookies are square.
The fraction $^{5}/_{7}$ shows what part of the group of cookies are square.

Identify Fractions 14



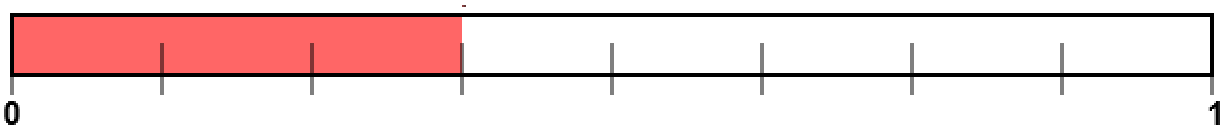
What fraction of the circle is shaded?

Identify Fractions 15



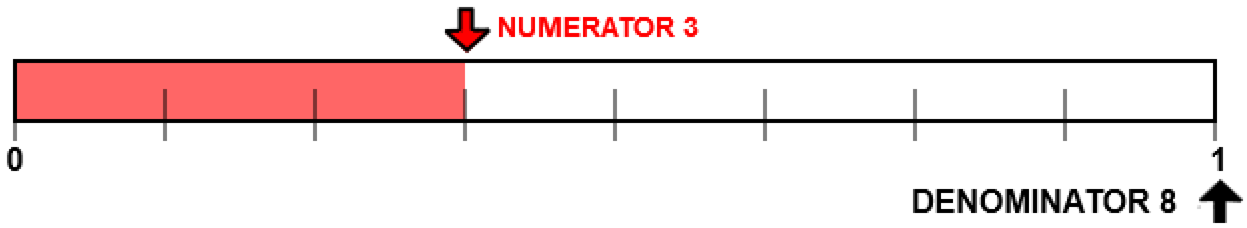
$\frac{6}{7}$ of the circle is shaded.

Identify Fractions 16



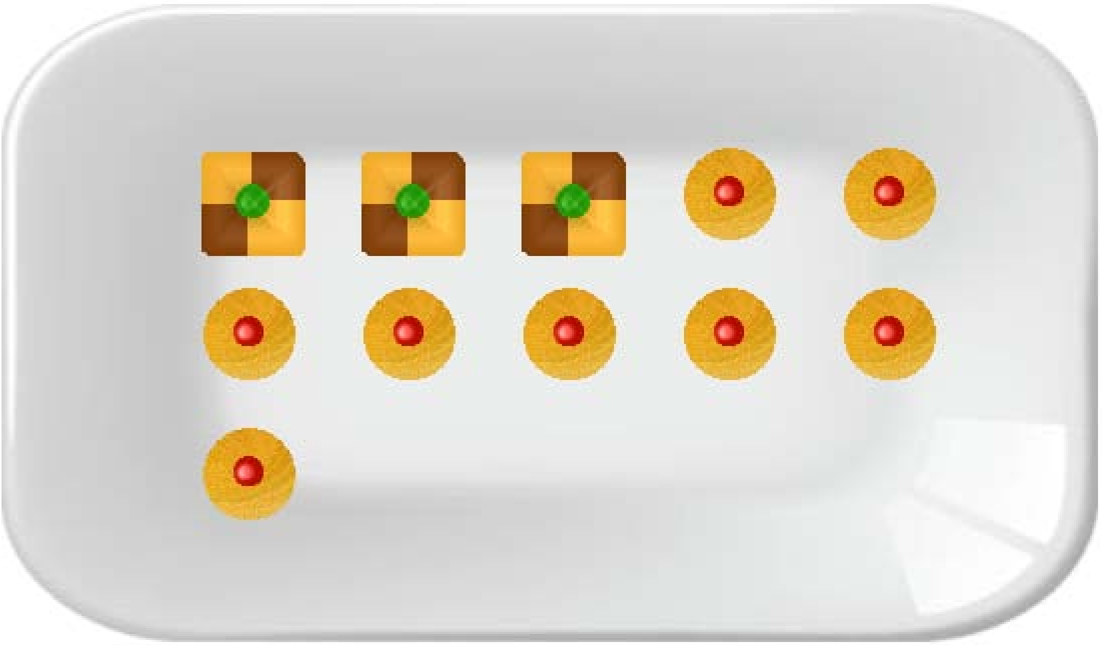
What fraction of the number line is shaded?

Identify Fractions 17



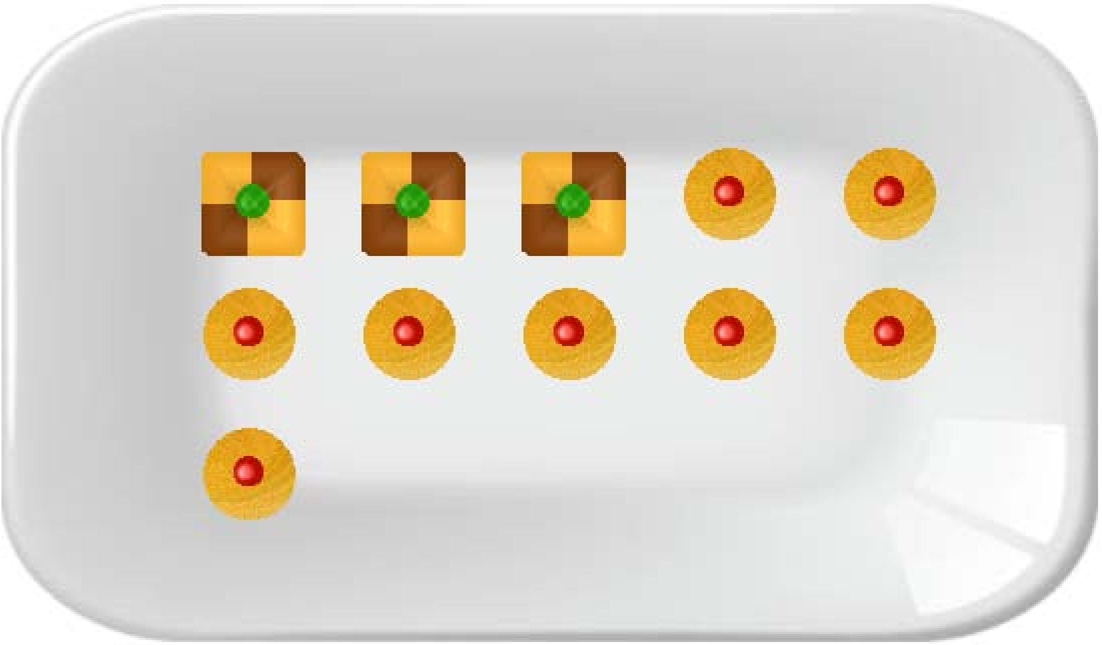
$\frac{3}{8}$ of the distance from 0 to 1 is shaded.

Identify Fractions 18



What fraction of the tray of cookies are square?

Identify Fractions 19

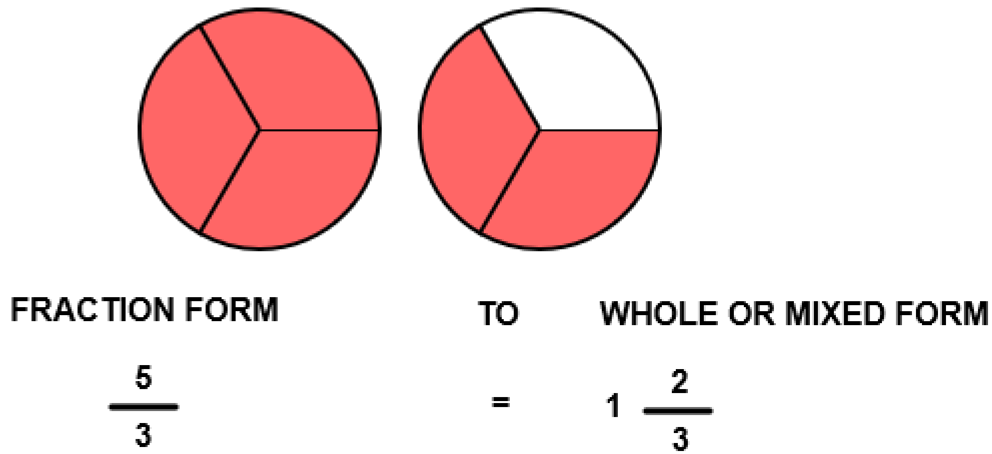


$^{3}/_{11}$ of the cookies are square.

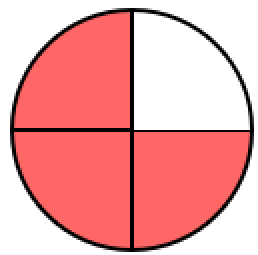
Fraction Form to Mixed Form

Introducing:

- fraction form
- mixed form
- improper
- $^{a}/_{b}$ form, b ≠ 0



Fraction Form to Mixed Form 1

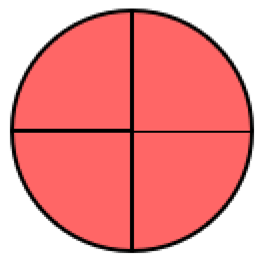


FRACTION FORM

$$\frac{3}{4}$$

This picture shows the fraction $^{3}/_{4}$. The circle is divided into 4 equal parts and 3 of the parts are selected.

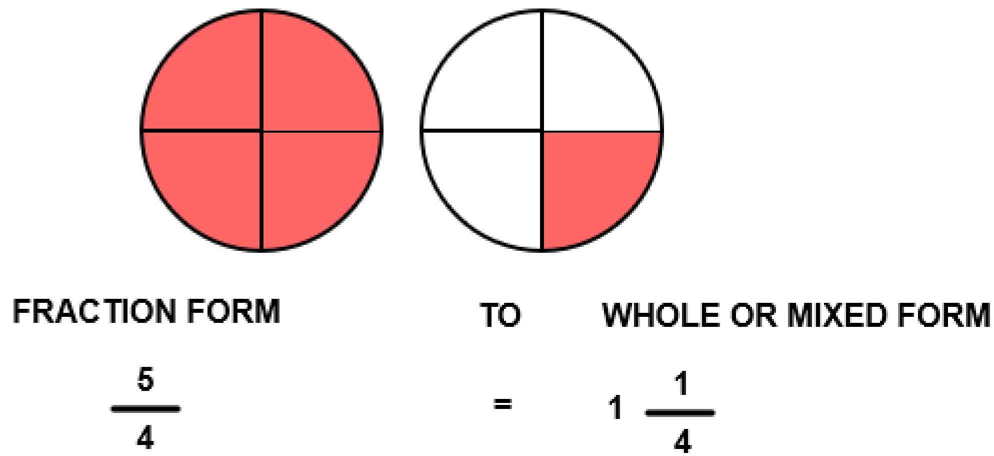
Fraction Form to Mixed Form 2



FRACTION FORM	TO	WHOLE OR MIXED FORM
$\frac{4}{4}$	=	1

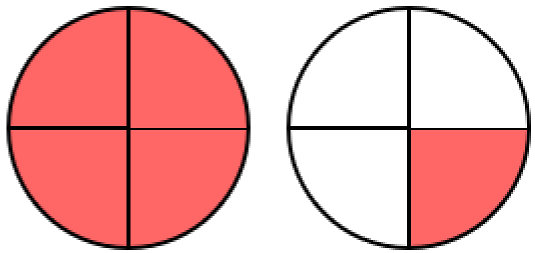
Increasing the numerator by one gives the fraction $^{4}/_{4}$. The picture shows that the numerator and denominator are the same. All parts of the circle are selected. This gives us a whole number of 1 since the complete unit is selected. You can think of the bar between the numerator and the denominator as a division bar. So 4 divided by 4 equals 1.

Fraction Form to Mixed Form 3



Increasing the numerator again by one gives the fraction $^5/_4$. The picture shows that the numerator is larger than the denominator. Some texts call a fraction such as this *improper,* where the numerator is equal to or larger than the denominator.

Fraction Form to Mixed Form 4



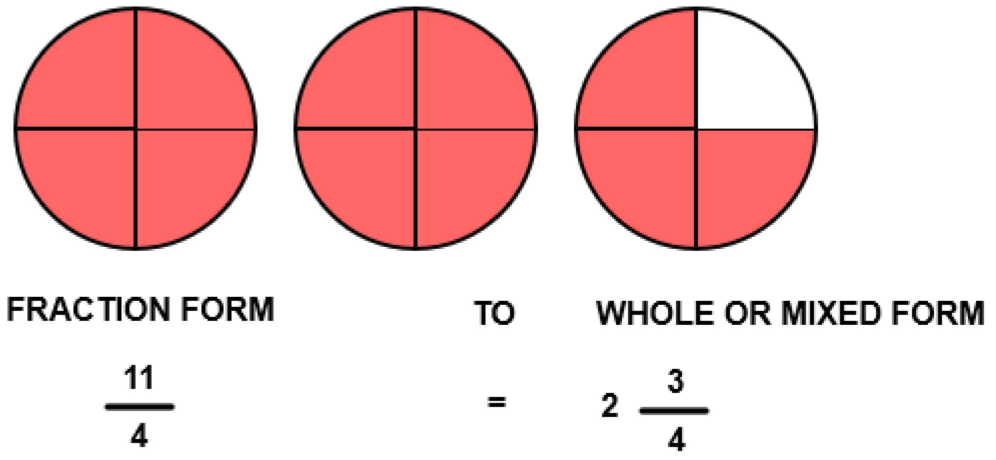
FRACTION FORM TO WHOLE OR MIXED FORM

$$\frac{5}{4} = 1\frac{1}{4}$$

You can see by the picture that one complete unit and $^1/_4$ unit are selected. So the fraction $^5/_4$ can be written as $1^1/_4$. $^5/_4$ is the *fraction* form or *improper* form of the number. A fraction such as $1^1/_4$ that has a whole number part and a fraction part is known as a *mixed number.*

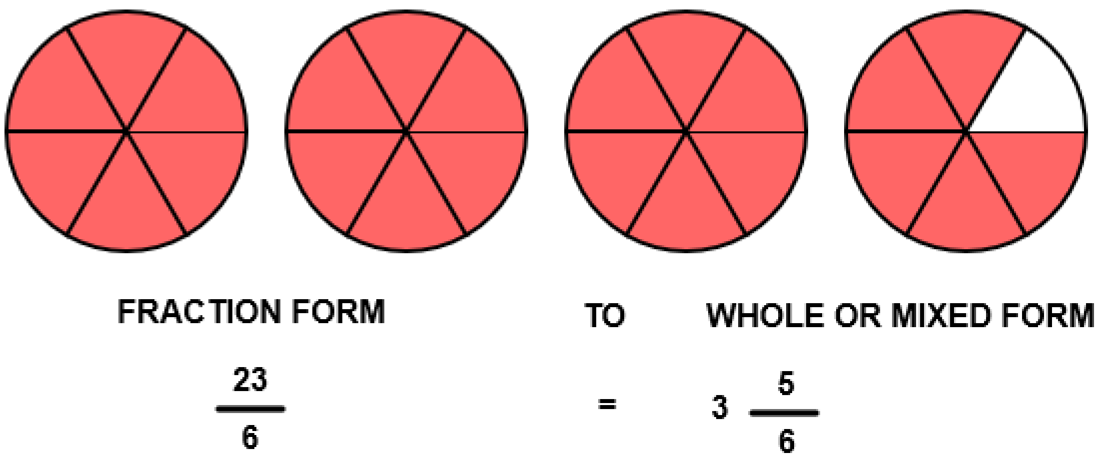
The fraction form can also be called the $^a/_b$ *form*, providing that you specify that b is not equal to zero.

Fraction Form to Mixed Form 5

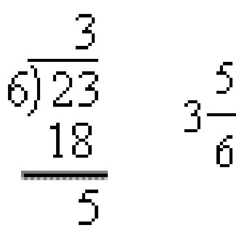


This picture shows how $^{11}/_4$ makes two complete units and $^3/_4$ of another unit . You can see from the picture that we have $^4/_4 + ^4/_4 + ^3/_4$ or $1+1+^3/_4$ or $2\ ^3/_4$.

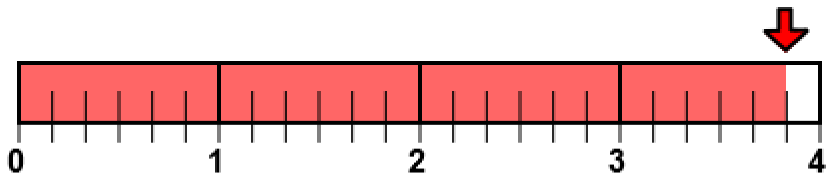
Fraction Form to Mixed Form 6



You can calculate the *mixed form of a number* from the *fraction* (${}^{a}/_{b}$) form. Rename ${}^{23}/_{6}$ by dividing the numerator 23 by the denominator 6 as is shown in the example on the right. The quotient 3 is the whole number. The remainder 5 is the numerator and the denominator is the same denominator 6.



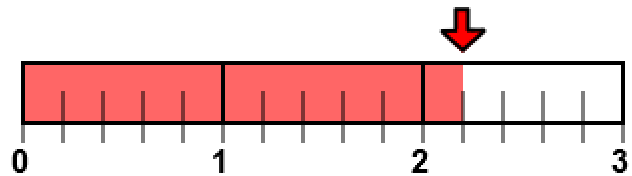
Fraction Form to Mixed Form 7



$$\frac{23}{6} = 3\,\frac{5}{6}$$

The same amount, $^{23}/_{6}$, is shown with a number line.

Fraction Form to Mixed Form 8

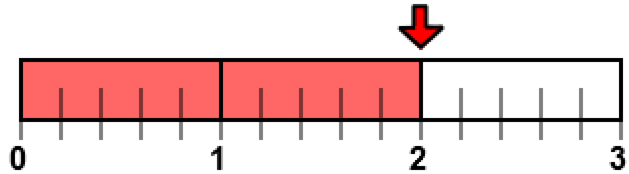


FRACTION FORM TO WHOLE OR MIXED FORM

$$\frac{11}{5} = 2\frac{1}{5}$$

The amount shown at the arrow can be written as $^{11}/_{5}$ or 2 $^{1}/_{5}$. Notice that $^{5}/_{5}$ names one unit and that there are two $^{5}/_{5}$ units.

Fraction Form to Mixed Form 9

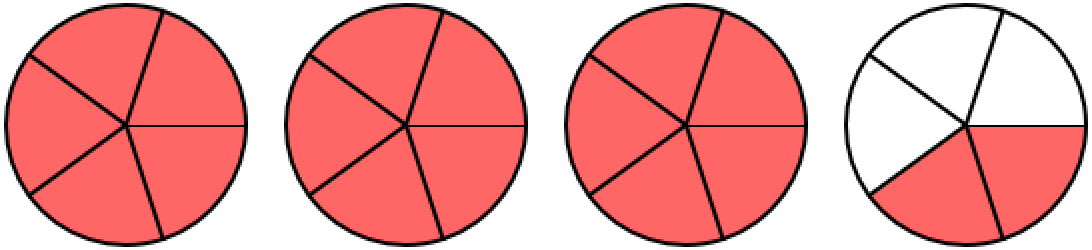


FRACTION FORM TO WHOLE OR MIXED FORM

$$\frac{10}{5} = 2$$

Notice how the fraction $^{10}/_{5}$ gives the whole number 2.

Fraction Form to Mixed Form 10

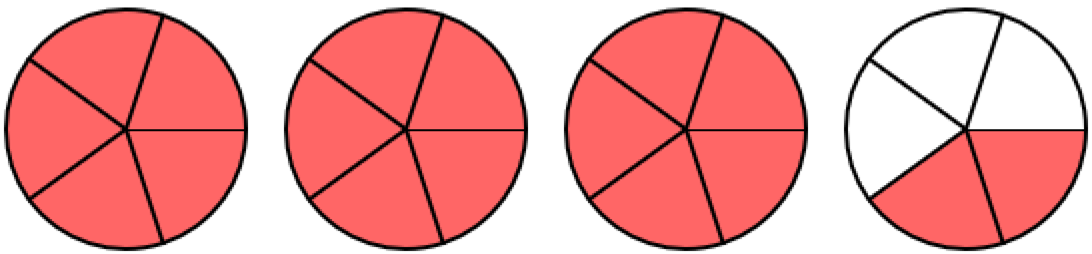


FRACTION FORM

$$\frac{17}{5}$$

Write in mixed or whole form.

Fraction Form to Mixed Form 11

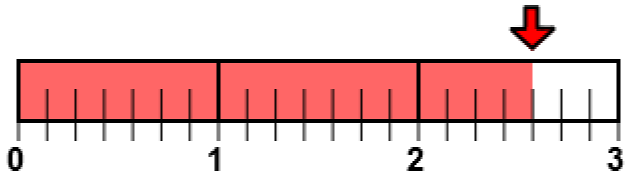


FRACTION FORM TO WHOLE OR MIXED FORM

$$\frac{17}{5} = 3\frac{2}{5}$$

Divide the numerator 17 by the denominator 5.
The quotient 3 is the whole number. The remainder 2 is the numerator.
The divisor 5 is the denominator.

Fraction Form to Mixed Form 12

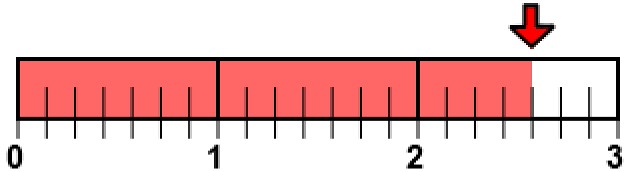


FRACTION FORM

$$\frac{18}{7} \quad =$$

Write in mixed or whole form.

Fraction Form to Mixed Form 13



FRACTION FORM TO WHOLE OR MIXED FORM

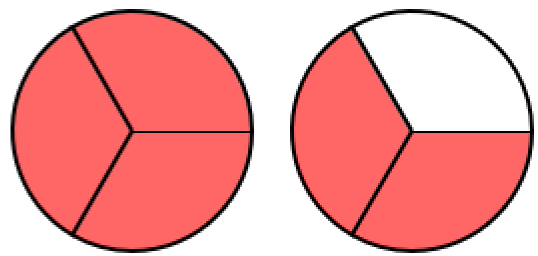
$$\frac{18}{7} = 2\frac{4}{7}$$

Divide the numerator 18 by the denominator 7.
The quotient 2 is the whole number.
The remainder 4 is the numerator.
The divisor 7 is the denominator.

Mixed Form to Fraction Form

Introducing:

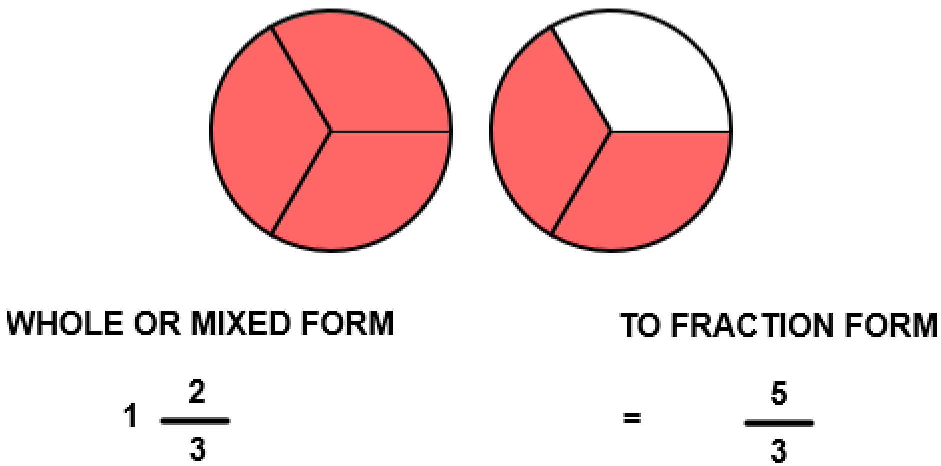
•mixed fraction
•fraction form
•Improper fraction



WHOLE OR MIXED FORM $1\frac{2}{3}$

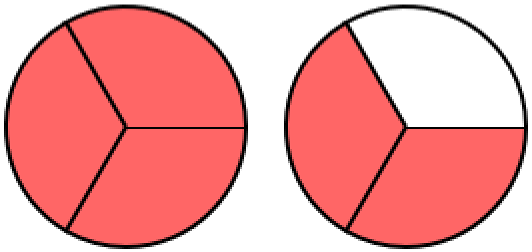
TO FRACTION FORM $= \frac{5}{3}$

Mixed Form To Fraction Form 1



This picture shows the fraction 1 $^2/_3$. The complete circle on the left is selected and $^2/_3$ of the other circle is selected. A fraction such as 1 $^2/_3$ that has a whole number part and a fraction part is a *mixed fraction*.

Mixed Form To Fraction Form 2

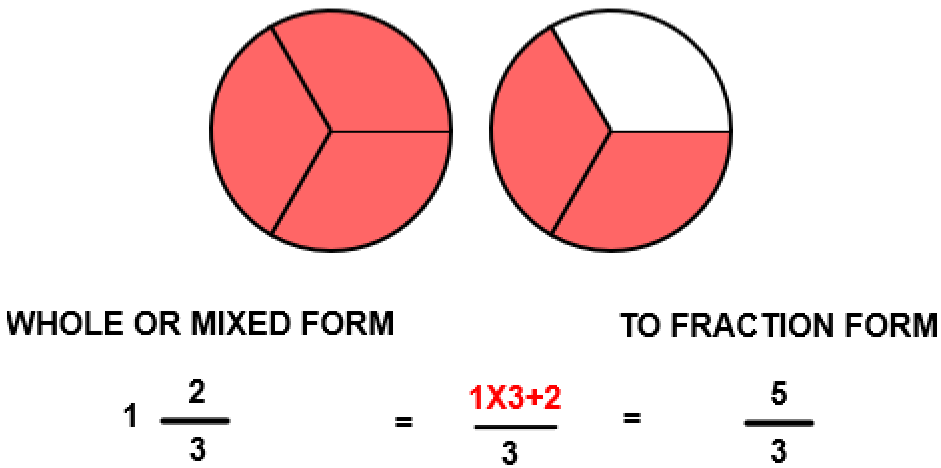


WHOLE OR MIXED FORM		TO FRACTION FORM

$$1\frac{2}{3} = \frac{1X3+2}{3} = \frac{5}{3}$$

Every whole number or *mixed fraction* can be written in *fraction* ($^a/_b$) *form*. You can calculate the *fraction form* for 1 $^2/_3$ by multiplying the whole number 1 by the denominator 3 and then adding the numerator 2 for a numerator of 5 in the *fraction form*.

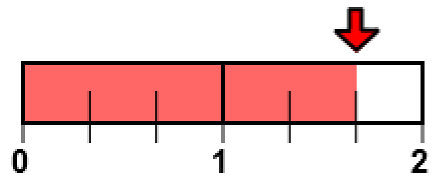
Mixed Form To Fraction Form 3



The picture shows that there are 5 one-third units or $^5/_3$.
Also, you can think of the unit 1 as $^3/_3$. Add $^3/_3$ to the partial unit $^2/_3$ for the *fraction* form $^5/_3$. This picture shows that $1\ ^2/_3 = {}^3/_3 + {}^2/_3 = {}^5/_3$.

Some texts call the fraction form an *improper fraction*. This is misleading because there is nothing improper about $^5/_3$.

Mixed Form To Fraction Form 4



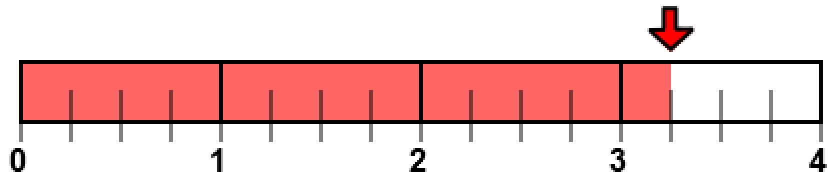
WHOLE OR MIXED FORM

TO FRACTION FORM

$$1\frac{2}{3} = \frac{1X3+2}{3} = \frac{5}{3}$$

The same amount, $1\ ^{2}/_{3}$, is shown with a number line.

Mixed Form To Fraction Form 5

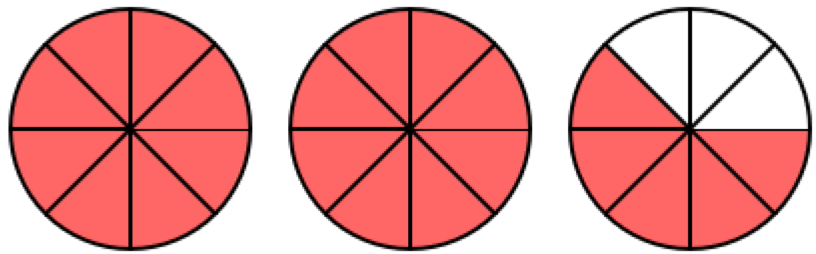


WHOLE OR MIXED FORM TO FRACTION FORM

$$3\frac{1}{4} = \frac{3X4+1}{4} = \frac{13}{4}$$

The amount shown at the arrow can be written as 3 $^{1}/_{4}$ or $^{13}/_{4}$. Notice that there are 13 marks from zero to the arrow.

Mixed Form To Fraction Form 6



WHOLE OR MIXED FORM

$2\frac{5}{8}$

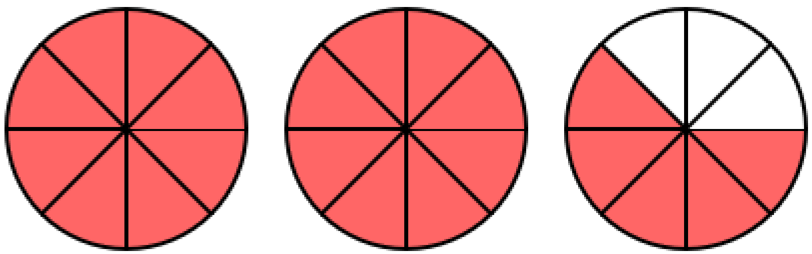
TO FRACTION FORM

$= \frac{21}{8}$

Multiply the whole number 2 by the denominator 8.
Then add the numerator 5 for the fraction numerator 21.

This picture shows the *mixed fraction* 2 $^5/_8$. If you were to count all the parts that are colored you would have a total of 21 parts, giving the numerator for the fraction $^{21}/_8$.

Mixed Form To Fraction Form 7



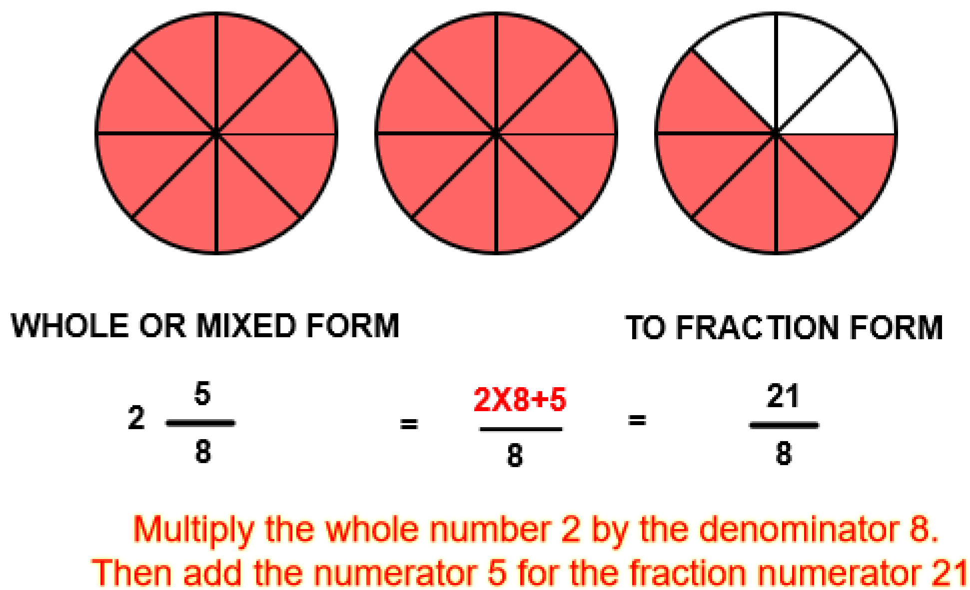
WHOLE OR MIXED FORM TO FRACTION FORM

$$2\frac{5}{8} = \frac{21}{8}$$

Multiply the whole number 2 by the denominator 8.
Then add the numerator 5 for the fraction numerator 21.

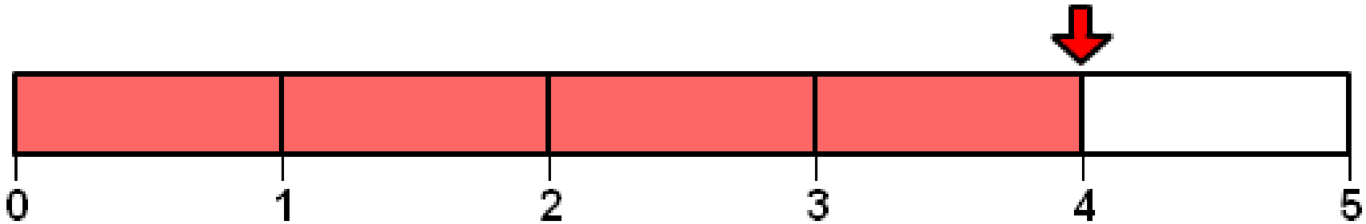
Since each unit or circle has 8 parts, each completely colored circle can be written as $^8/_8$. This gives us $^8/_8 + {}^8/_8 + {}^5/_8$ circles for $^{21}/_8$ circles.

Mixed Form To Fraction Form 8



Or you can multiply the whole number 2 times the denominator 8 and then add the numerator 5 for a numerator of 21 in the *fraction form*.

Mixed Form To Fraction Form 9



Whole Number Form to Fraction Form.

$$4 = \frac{4 \times 1 + 0}{1} = \frac{4}{1}$$

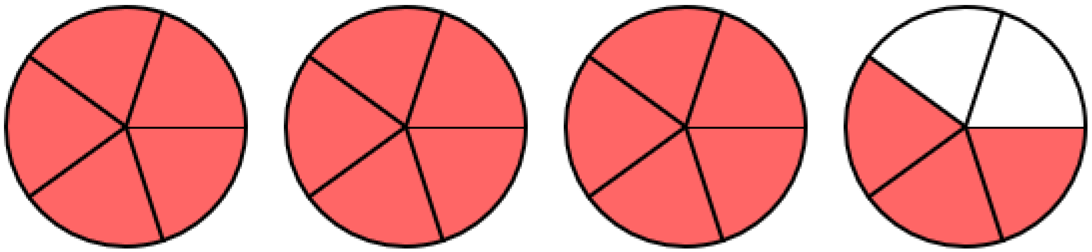
To write the whole number 4 in *fraction form* simply write the whole number 4 over the denominator 1.

Mixed Form To Fraction Form 10

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

What is in $3\ ^{3}/_{5}$ fraction form?

Mixed Form To Fraction Form 11



WHOLE OR MIXED FORM TO FRACTION FORM

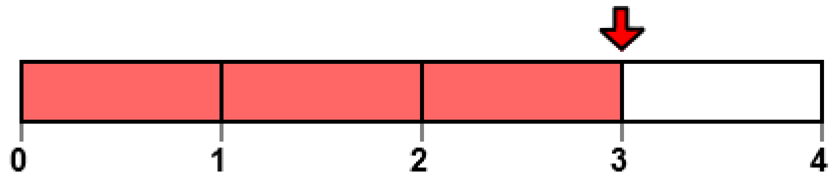
$$3\frac{3}{5} = \frac{3X5+3}{5} = \frac{18}{5}$$

Multiply the whole number 3 by the denominator 5.
Then add the numerator 3 for the fraction numerator 18.

Mixed Form To Fraction Form 12

What is in 3 fraction form?

Mixed Form To Fraction Form 13



WHOLE OR MIXED FORM TO FRACTION FORM

$$3\frac{0}{1} = \frac{3X1+0}{1} = \frac{3}{1}$$

Multiply the whole number 3 by the denominator 1.
Then add the numerator 0 for the fraction numerator 3.

Rename To Higher Terms

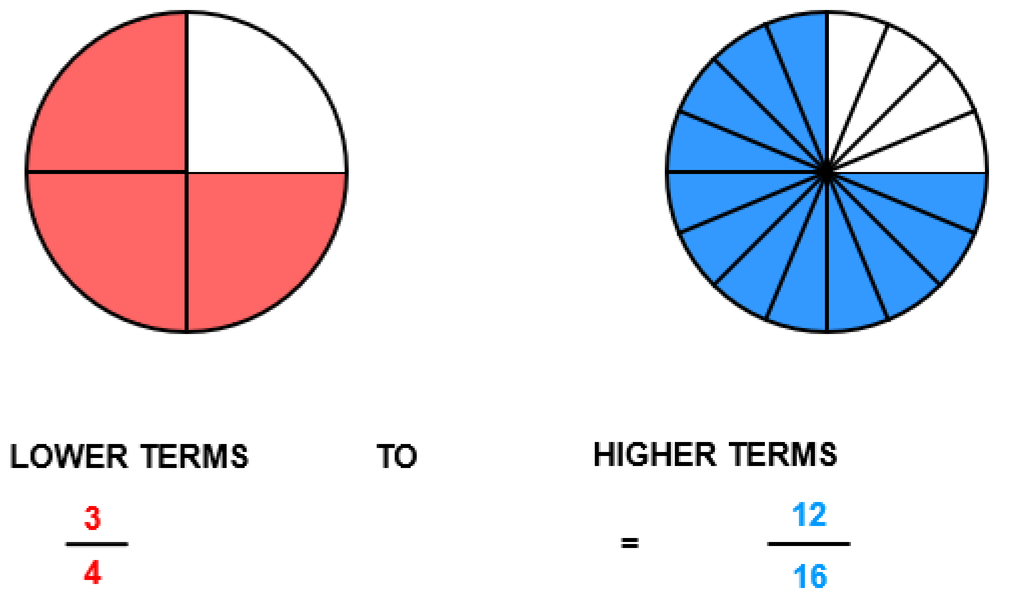
Introducing:

- higher terms
- identity

LOWER TERMS TO HIGHER TERMS

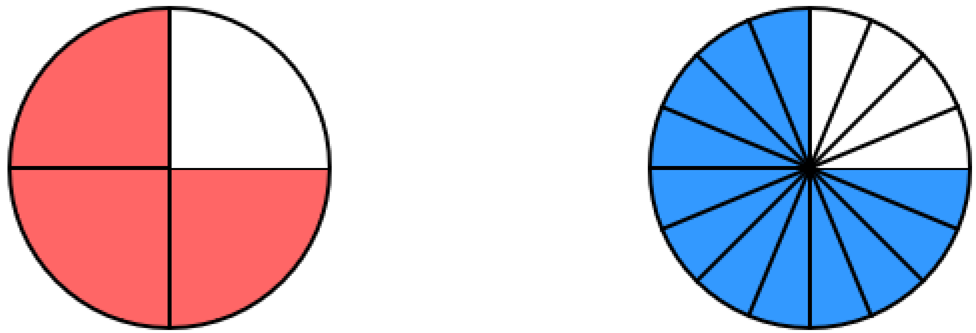
$$\frac{3}{4} = \frac{12}{16}$$

Rename to Higher Terms 1



The picture shows two fractions that are the same size. The fraction on the right is in *higher terms* because the numerator and denominator are larger. The parts are smaller in the fraction on the right but there are more parts, making the two fractions equal.

Rename to Higher Terms 2

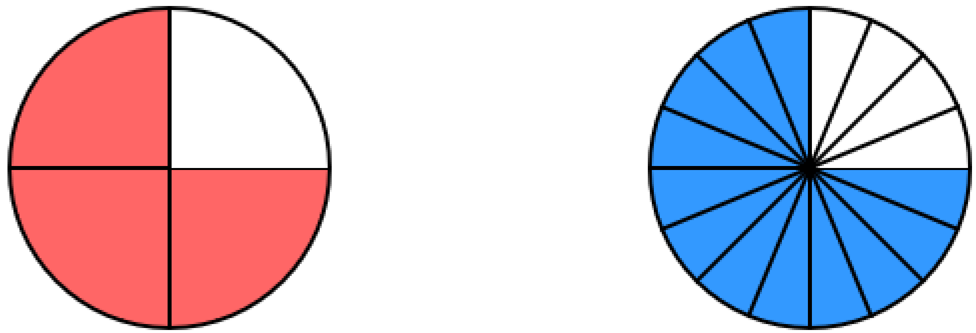


LOWER TERMS TO HIGHER TERMS

$$\frac{3}{4} \times \frac{4}{4} = \frac{12}{16}$$

To rename a fraction in *higher terms*, multiply both the numerator and denominator by the same number. The picture shows that the numerator 3 and the denominator 4 are each multiplied by 4, giving the fraction $^{12}/_{16}$.

Rename to Higher Terms 3

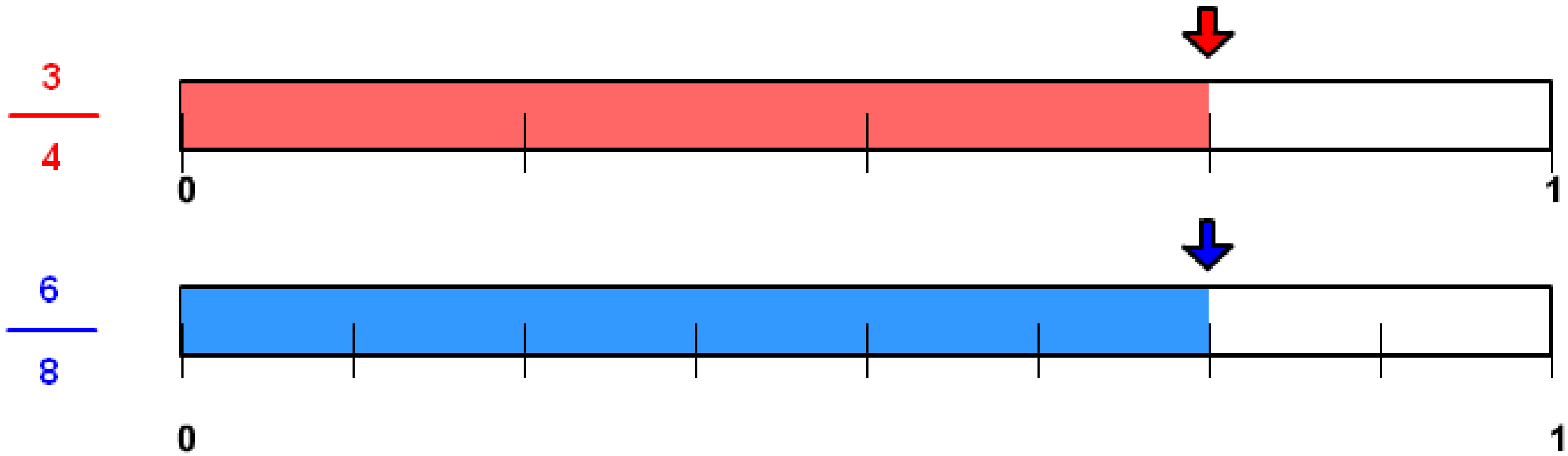


LOWER TERMS TO HIGHER TERMS

$$\frac{3}{4} \times \frac{4}{4} = \frac{12}{16}$$

The number $^{4}/_{4}$ is equal to 1. Multiplying by 1 or any form of 1 will not change the size of the number. One (1) is the *identity* for multiplication.

Rename to Higher Terms 4



$$\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$$

The top fraction shows $^3/_4$ and the lower fraction shows $^6/_8$. Notice how $^3/_4$ and $^6/_8$ are the same distance on the number lines. Multiplying both the numerator and the denominator by 2 will give a numerator of 6 and a denominator of 8.

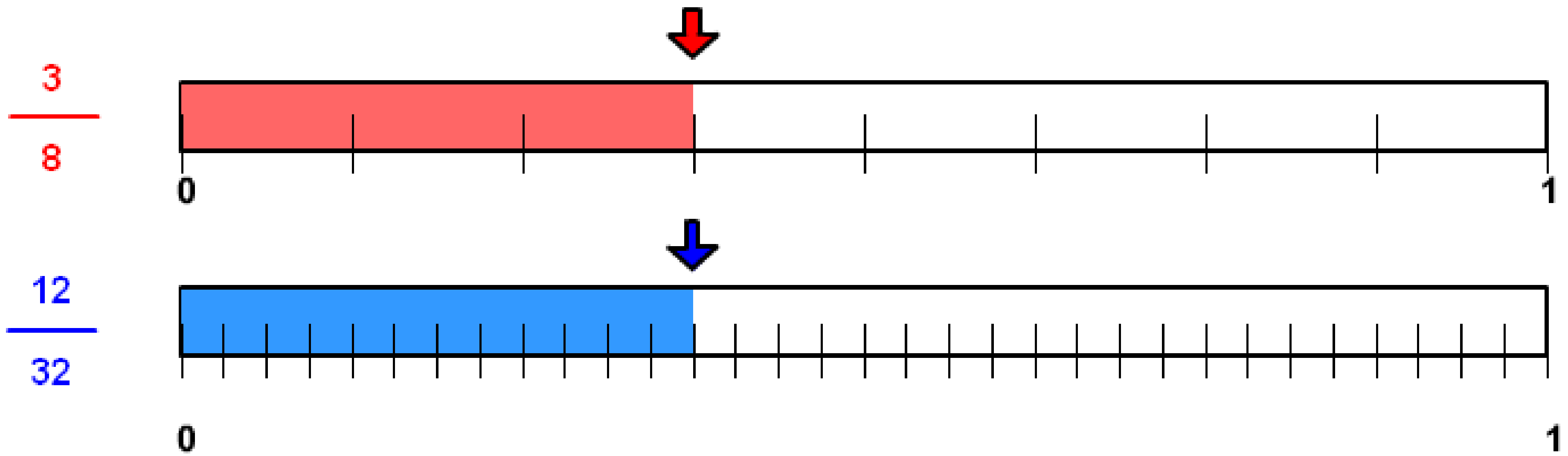
Rename to Higher Terms 5

$$\frac{3}{8} = \frac{?}{32}$$

Often you are asked to write a fraction in higher terms without a picture of the fraction. Here, you are asked to write $^{3}/_{8}$ as 32's.

To do this, determine what the denominator 8 is multiplied by to get a denominator 32. In this case 8 is multiplied by 4 to get 32. Then multiply the numerator by 4 to get a numerator of 12.

Rename to Higher Terms 6



$$\frac{3}{8} \times \frac{4}{4} = \frac{12}{32}$$

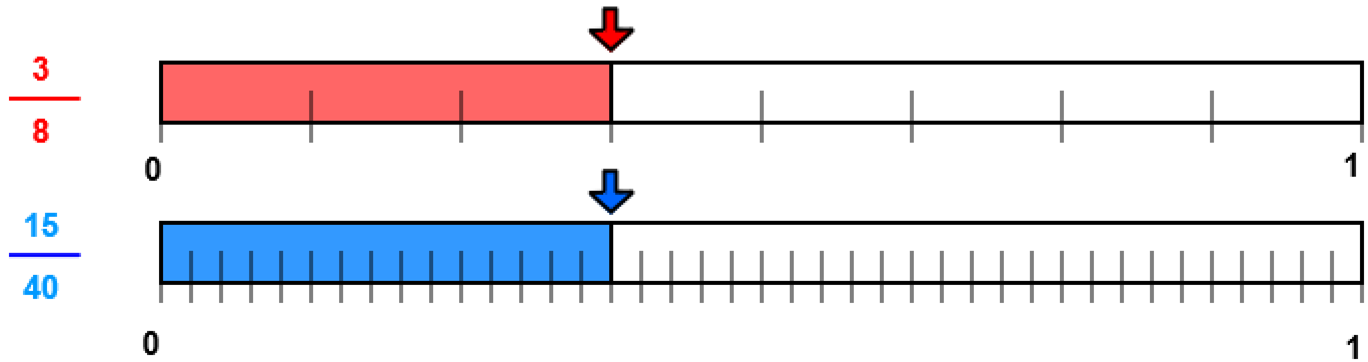
This is a picture of the previous example. Notice that $^{3}/_{8}$ and $^{12}/_{32}$ are at the same position on the number line. The fraction $^{3}/_{8}$ is renamed as $^{12}/_{32}$ by multiplying by $^{4}/_{4}$, which is a form of one.

Rename to Higher Terms 7

$$\frac{3}{8} = \frac{?}{40}$$

Write $^{3}/_{8}$ with a denominator of 40.

Rename to Higher Terms 8



LOWER TERMS TO HIGHER TERMS

$$\frac{3}{8} \times \frac{5}{5} = \frac{15}{40}$$

Multiplying both numerator and denominator by 5 is the same as multiplying by 1.

$^3/_8 = {}^{15}/_{40}$

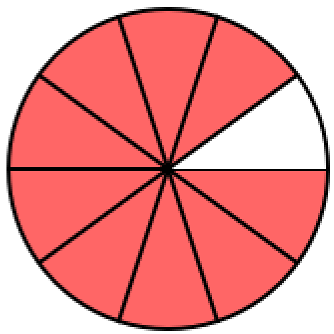
Rename to Higher Terms 9

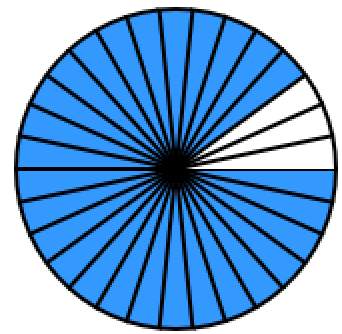
$$\frac{9}{10} = \frac{?}{30}$$

Write $^{9}/_{10}$ with a denominator of 30.

Rename to Higher Terms 10

$\frac{9}{10}$





$\frac{27}{30}$

LOWER TERMS TO HIGHER TERMS

$$\frac{9}{10} \times \frac{3}{3} = \frac{27}{30}$$

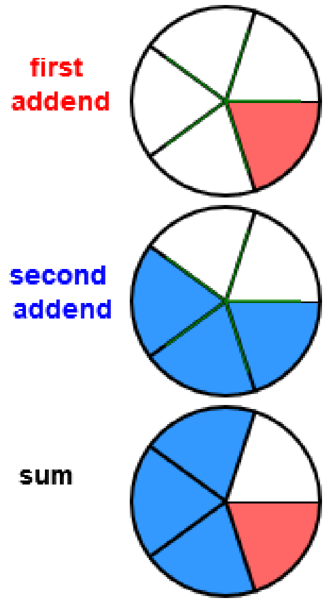
Multiplying both numerator and denominator by 3 is the same as multiplying by 1.

$$^{9}/_{10} = {}^{27}/_{30}$$

HOW TO ADD FRACTIONS

Introducing:

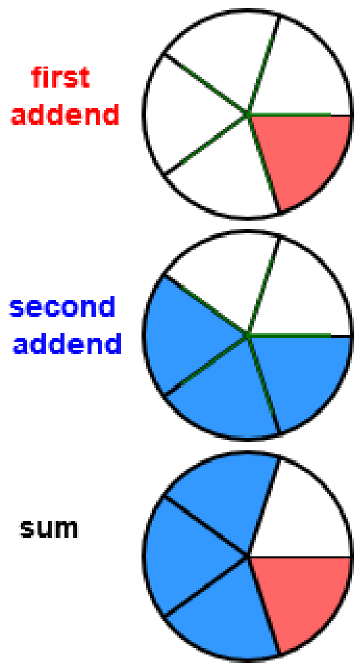
- first addend
- second addend
- sum



$\frac{1}{5}$ + $\frac{3}{5}$ = = $\frac{4}{5}$

first addend second addend Simplify

Add Fractions 1

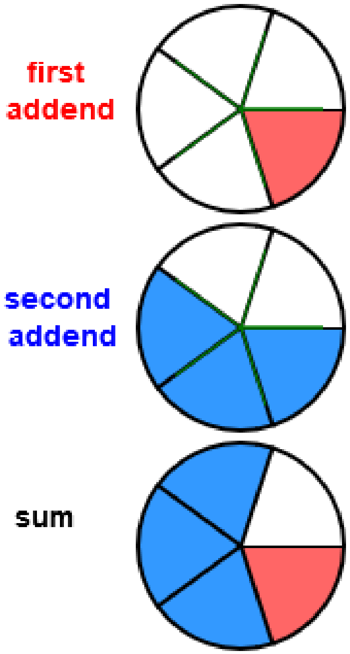


$\frac{1}{5} + \frac{3}{5} = \qquad = \frac{4}{5}$

first addend second addend Simplify

This picture shows an addition example with two *addends* and a *sum*. The *first addend* ${}^{1}/_{5}$ is combined with the *second addend* ${}^{3}/_{5}$ to give the *sum* ${}^{4}/_{5}$. Notice how the *sum* ${}^{4}/_{5}$ combines the 1 red fifth with the 3 blue fifths.

Add Fractions 2

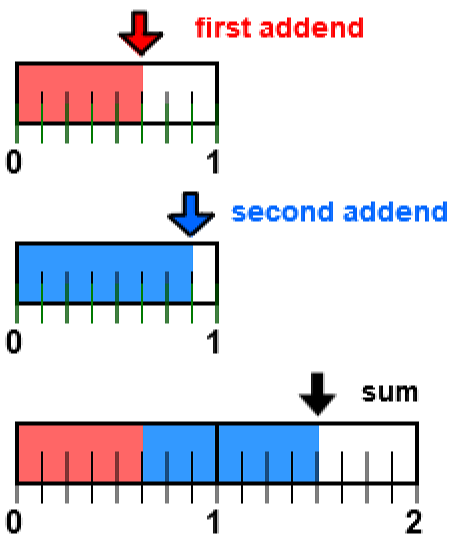


$$\frac{1}{5} + \frac{3}{5} = \frac{(1+3)}{5} = \frac{4}{5} = \frac{4}{5}$$

first addend second addend Add numerators. Simplify

$^{1}/_{5}$ and $^{3}/_{5}$ are like fractions because the denominators are the same. When the *addend* denominators are the same, add the numerators to get the numerator of the *sum*.

Add Fractions 3

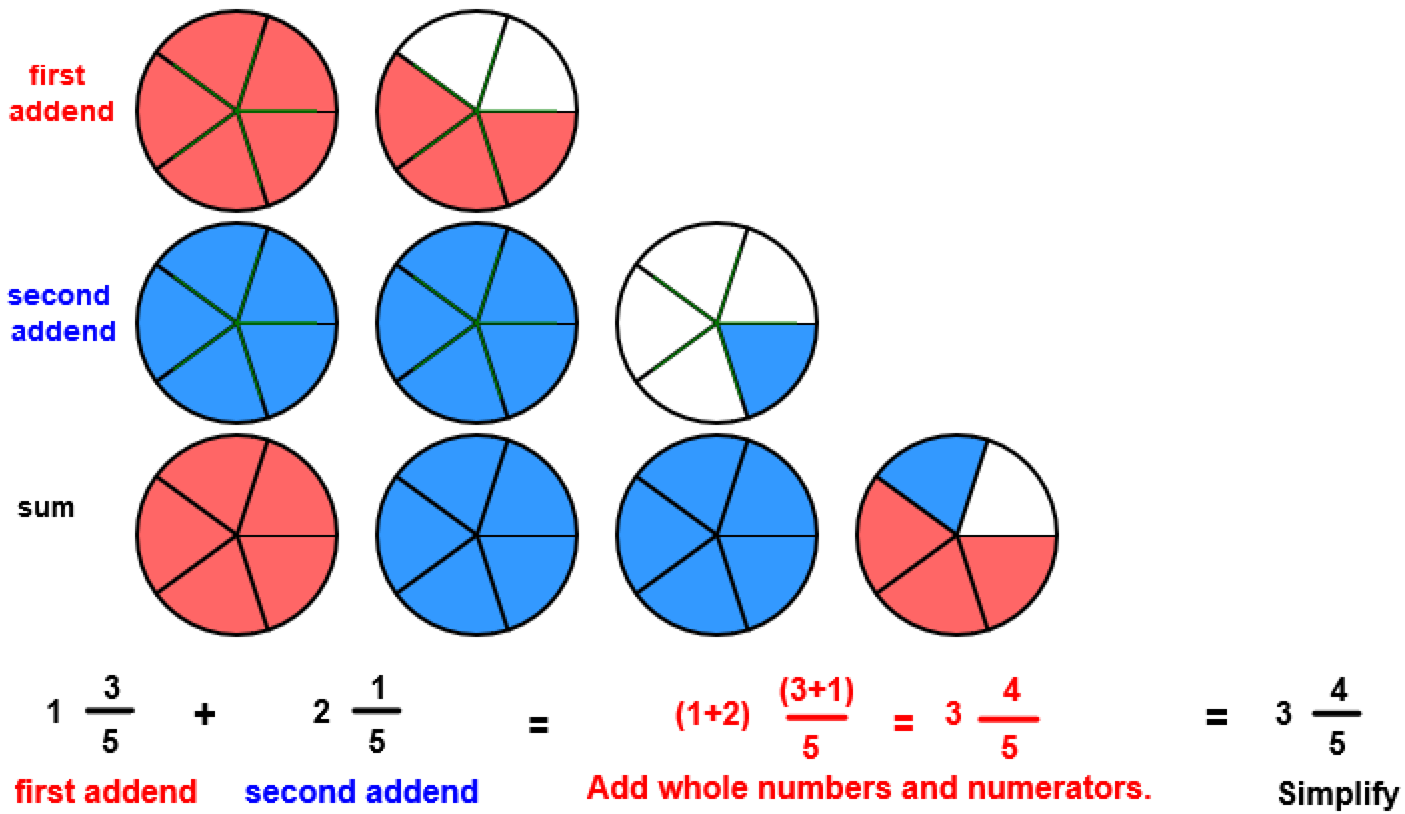


$$\frac{5}{8} + \frac{7}{8} = \frac{(5+7)}{8} = \frac{12}{8} = 1\,\frac{1}{2}$$

first addend — second addend — Add numerators. — Simplify

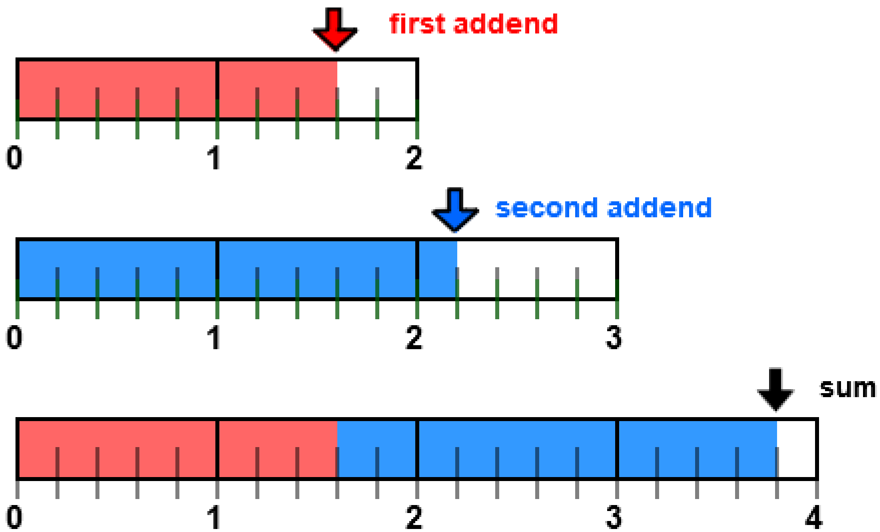
The *sum* $^{12}/_{8}$ is written as a mixed number in lowest terms. The numerals $^{12}/_{8}$ and $1\ ^{1}/_{2}$ are correct names for the *sum* of $^{5}/_{8}$ and $^{7}/_{8}$.

Add Fractions 4



Here, mixed numbers are added. The whole number 1 in 1 $^3/_5$ is added to the whole number 2 in 2 $^1/_5$ for a whole number 3 in the *sum*. The fractions $^3/_5$ and $^1/_5$ are added for the $^4/_5$ in the *sum*.

Add Fractions 5



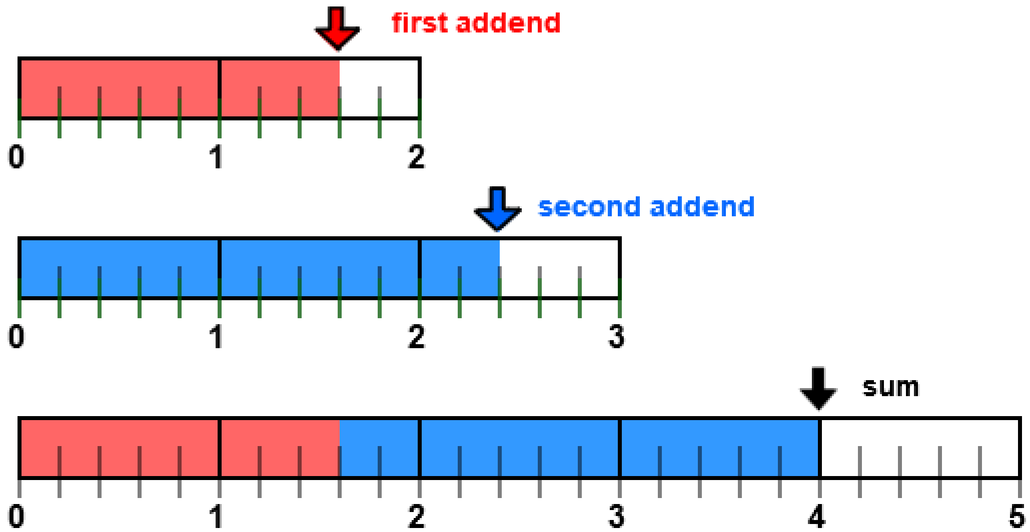
$$1\frac{3}{5} + 2\frac{1}{5} = (1+2)\frac{(3+1)}{5} = 3\frac{4}{5} = 3\frac{4}{5}$$

first addend; second addend; Add whole numbers and numerators.; Simplify

The same example $1\ {}^{3}/_{5}$ plus $2\ {}^{1}/_{5}$ is shown with number lines. Add the whole numbers and then the fractions:

$1\ {}^{3}/_{5} + 2\ {}^{1}/_{5} = (1+2) + ({}^{3}/_{5} + {}^{1}/_{5}) = 3\ {}^{4}/_{5}$.

Add Fractions 6

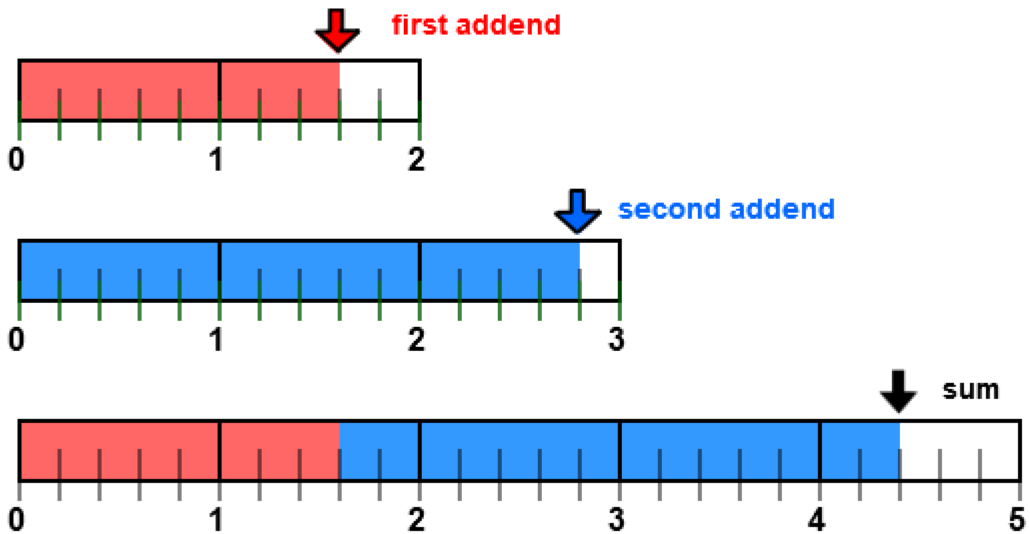


$$1\,\frac{3}{5} \;+\; 2\,\frac{2}{5} \;=\; (1+2)\,\frac{(3+2)}{5} \;=\; 3\,\frac{5}{5} \;=\; 4$$

first addend — second addend — Add whole numbers and numerators. — Simplify

This example shows the *sum* $3\ {}^{5}/_{5}$ written as 4. Since the fraction ${}^{5}/_{5}$ is equal to 1, $3\ {}^{5}/_{5}$ is equal to 3 + 1 for a *sum* of 4

Add Fractions 7

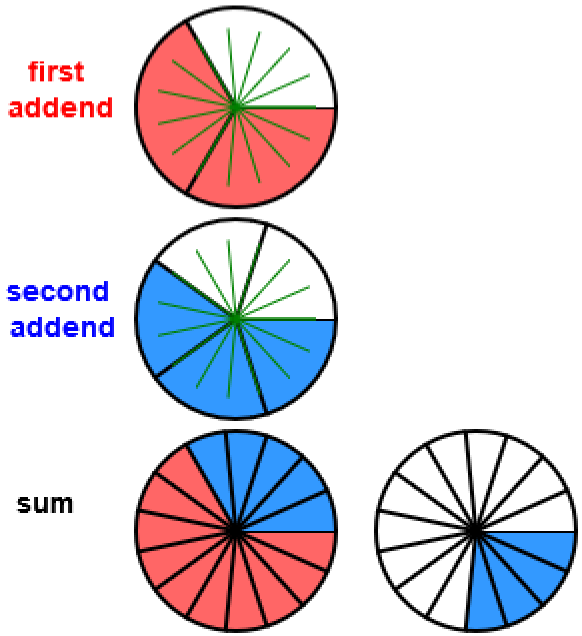


$$1\frac{3}{5} + 2\frac{4}{5} = (1+2)\frac{(3+4)}{5} = 3\frac{7}{5} = 4\frac{2}{5}$$

first addend — second addend — Add whole numbers and numerators. — Simplify

This example shows the *sum* $3\ {}^{7}/_{5}$ written as $4\ {}^{2}/_{5}$. The ${}^{7}/_{5}$ part of the *sum* can be renamed as $1\ {}^{2}/_{5}$. The 1 in $1\ {}^{2}/_{5}$ is added to the whole number 3 for the 4 in $4\ {}^{2}/_{5}$: $1\ {}^{3}/_{5} + 2\ {}^{4}/_{5} = 3\ {}^{7}/_{5} = 3 + 1\ {}^{2}/_{5} = 4\ {}^{2}/_{5}$.

Add Fractions 8

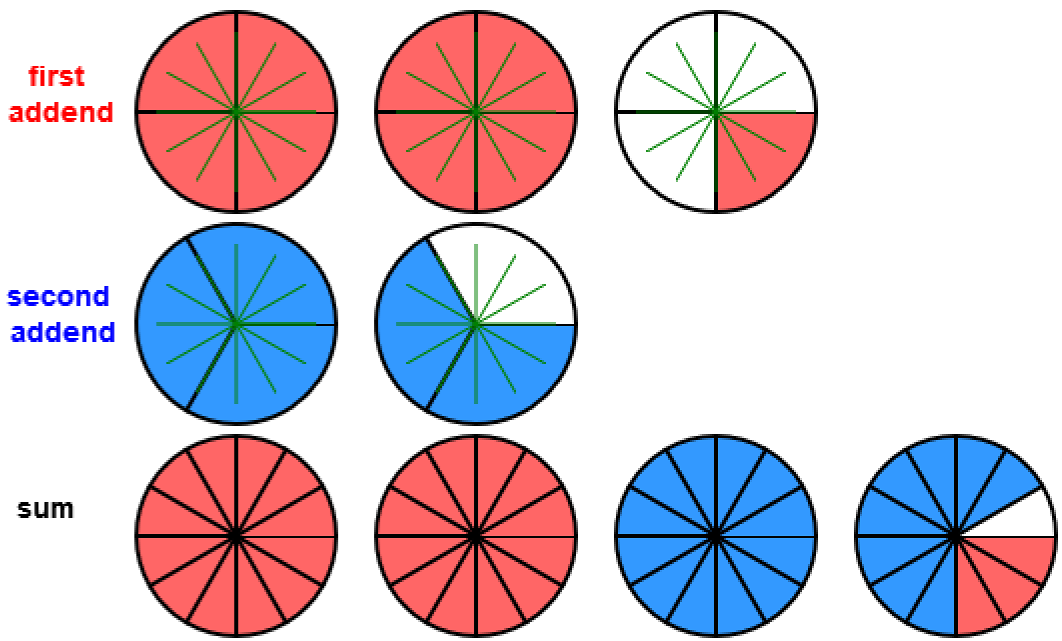


$$\frac{2}{3} + \frac{3}{5} = \frac{(10+9)}{15} = \frac{19}{15} = 1\,\frac{4}{15}$$

first addend | second addend | Write with common denominator 15. Then add. | Simplify

The *addends* $^2/_3$ and $^3/_5$ are unlike fractions. Each addend is written with the common denominator 15, giving $^{10}/_{15}$ and $^9/_{15}$. Then add the numerators for a *sum* of $^{19}/_{15}$ or 1 $^4/_{15}$.

Add Fractions 9

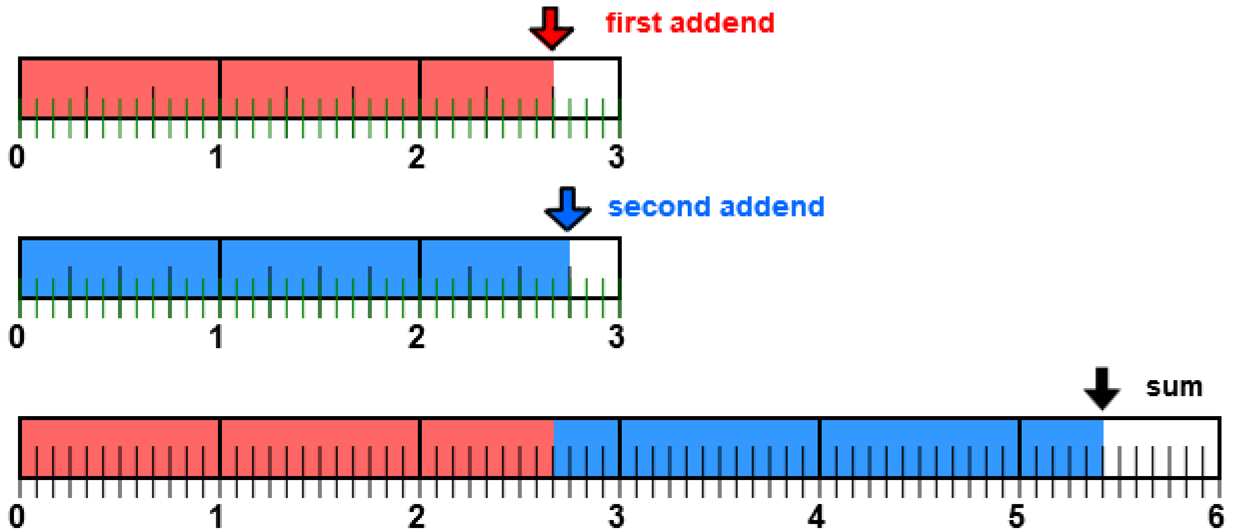


$$2\frac{1}{4} \quad + \quad 1\frac{2}{3} \quad = \quad (2+1)\,\frac{(3+8)}{12} = 3\,\frac{11}{12} \quad = \quad 3\,\frac{11}{12}$$

first addend | second addend | Write with common denominator 12. Then add. | Simplify

The unlike fractions $2^1/_4$ and $1^2/_3$ are renamed as like fractions $2^3/_{12}$ and $1^8/_{12}$. Then the whole numbers and numerators are added for a *sum* of $3^{11}/_{12}$.

Add Fractions 10

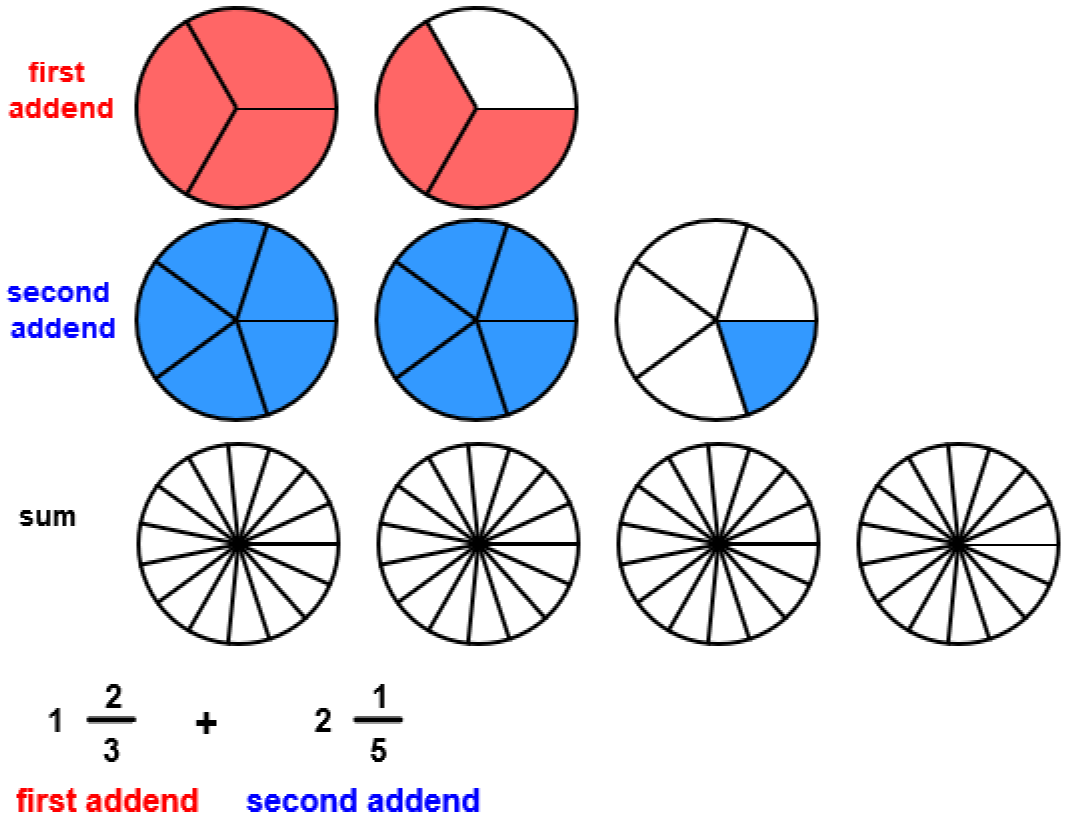


$$2\frac{2}{3} \quad + \quad 2\frac{3}{4} \quad = \quad (2+2)\frac{(8+9)}{12} = 4\frac{17}{12} \quad = \quad 5\frac{5}{12}$$

first addend | second addend | Write with common denominator 12. Then add. | Simplify

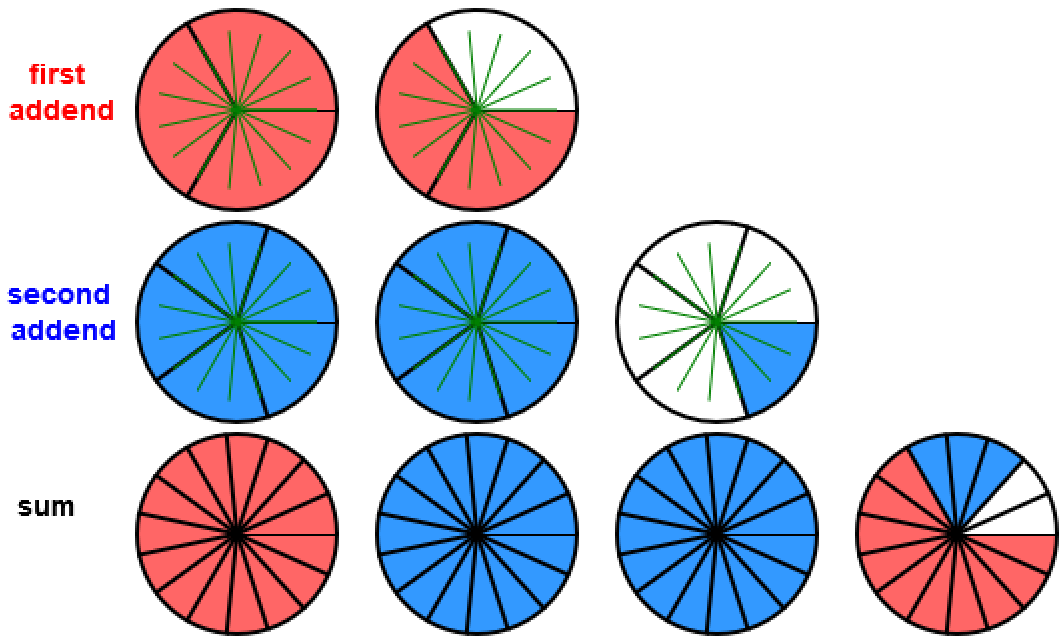
Write each *addend* with a common denominator 12. Because $^{17}/_{12}$ can be written as $1^{5}/_{12}$, we can write the *sum* $4\ ^{17}/_{12}$ as $5\ ^{5}/_{12}$.

Add Fractions 11



What is the *sum* of 1 $^{2}/_{3}$ and 2 $^{1}/_{5}$

Add Fractions 12



$$1\frac{2}{3} + 2\frac{1}{5} = (1+2)\frac{(10+3)}{15} = 3\frac{13}{15} = 3\frac{13}{15}$$

first addend | second addend | Write with common denominator 15. Then add. | Simplify

To find the sum from the picture, color the whole number parts of each addend onto the sum. So the first circle and the second and third circles will be colored in. Then color the fraction parts $^{2}/_{3}$ and $^{1}/_{5}$ onto the sum circles for a sum of 3 $^{13}/_{15}$. The illustration shows how the sum is calculated.