

Grade 5 · Dividing Unit Fractions and Whole Numbers · Lesson

Common Core 5.NF.B.7 · mathovore.fr

To divide a unit fraction by a whole number, split the fraction into equal parts: $\frac{1}{3} \div 4 = \frac{1}{12}$. To divide a whole number by a unit fraction, count the pieces that fit: $3 \div \frac{1}{4} = 12$. Check either answer by multiplying it by the divisor to get the starting number.

Grade 5 Common Core: 5.NF.B.7

Key facts:

- A unit fraction has a numerator of 1, such as $\frac{1}{5}$.
- A unit fraction divided by a whole number: $\frac{1}{n} \div k = \frac{1}{n \times k}$.
- A whole number divided by a unit fraction: $k \div \frac{1}{n} = k \times n$.
- Splitting a fraction makes smaller pieces; counting unit fractions in a whole number gives a larger answer.
- Check division by multiplying the quotient by the divisor.

How do you divide a unit fraction by a whole number?

A **unit fraction** has 1 on top, such as $\frac{1}{2}$, $\frac{1}{3}$ or $\frac{1}{10}$. To find $\frac{1}{3} \div 4$, split one third into 4 equal pieces. Cutting every third of the whole into 4 pieces makes 12 equal pieces in the whole, so each piece is $\frac{1}{12}$.



$$\frac{1}{3} \div 4 = \frac{1}{12} : \text{one third holds 4 twelfths.}$$

Rule for a unit fraction divided by a whole number

$\frac{1}{n} \div k = \frac{1}{n \times k}$. Splitting a piece into more parts makes each part smaller, so the answer is smaller than the starting fraction.

How do you divide a whole number by a unit fraction?

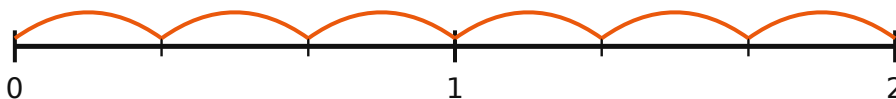
To find $3 \div \frac{1}{4}$, ask how many fourths fit into 3 wholes. Each whole holds 4 fourths, so 3 wholes hold $3 \times 4 = 12$ fourths.



Three wholes cut into fourths give 12 pieces: $3 \div \frac{1}{4} = 12$.

Rule for a whole number divided by a unit fraction

$k \div \frac{1}{n} = k \times n$. Dividing by a unit fraction counts how many pieces fit, so the answer is larger than the whole number.



Two wholes need 6 hops of $\frac{1}{3}$: $2 \div \frac{1}{3} = 6$.

How can you check a division answer?

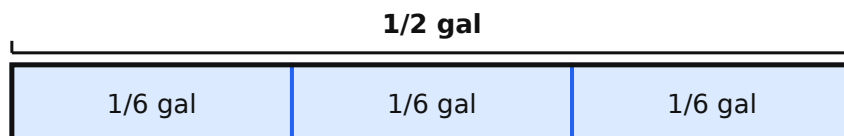
Multiply the answer by the divisor. You should get the starting number back.

Division	Answer	Check
$\frac{1}{4} \div 3$	$\frac{1}{12}$	$\frac{1}{12} \times 3 = \frac{1}{4}$
$3 \div \frac{1}{4}$	12	$12 \times \frac{1}{4} = 3$

How do you solve a division word problem?

1. Decide what is being split or counted.
2. Write the division equation.
3. Draw a model or use the rule.
4. Check by multiplying, and answer with units.

Example. Maya has $\frac{1}{2}$ gallon of lemonade to pour equally into 3 cups. The lemonade is split, so $\frac{1}{2} \div 3 = \frac{1}{6}$ gallon in each cup. Check: $3 \times \frac{1}{6} = \frac{1}{2}$.



One half gallon split into 3 equal cups.

The same lemonade could be counted instead of split: 5 cups of juice poured into 1/4-cup servings gives $5 \div \frac{1}{4} = 20$ servings.

Common mistake: mixing up the two types. $\frac{1}{2} \div 4 = \frac{1}{8}$ is small, but $4 \div \frac{1}{2} = 8$ is large.

Dividing Unit Fractions and Whole Numbers: frequently asked questions

How do you divide a unit fraction by a whole number?

Multiply the denominator by the whole number and keep the numerator 1. For example, $\frac{1}{5} \div 3 = \frac{1}{15}$. A picture helps: cut one fifth into 3 equal pieces.

How do you divide a whole number by a unit fraction?

Multiply the whole number by the denominator of the unit fraction. For example, $6 \div \frac{1}{5} = 6 \times 5 = 30$, because each whole holds 5 fifths.

Why does dividing by a unit fraction make the number bigger?

Dividing by $\frac{1}{n}$ asks how many pieces of size $\frac{1}{n}$ fit. Pieces are small, so many fit, and the answer is greater than the whole number.

How do you check a division with fractions?

Multiply the quotient by the divisor. If $\frac{1}{4} \div 3 = \frac{1}{12}$, then $\frac{1}{12} \times 3$ must equal $\frac{1}{4}$, and it does.

Which operation does a word problem need?

If something is shared equally, split it: unit fraction divided by a whole number. If you count how many servings or pieces fit, divide the whole number by the unit fraction.