

# Grade 5 · Dividing Whole Numbers · Lesson

Common Core 5.NBT.B.6 · mathovore.fr

Dividing whole numbers means splitting a dividend into equal groups to find the quotient and any remainder. With four-digit dividends and two-digit divisors, use place value, partial quotients, area models, or long division. Estimate first, then check by multiplying the quotient by the divisor and adding the remainder.

## Grade 5 Common Core: 5.NBT.B.6

### Key facts:

- Dividend divided by divisor equals quotient, plus a remainder if the groups do not fit evenly.
- An area model builds the quotient from partial quotients such as 50 and 4.
- Compatible numbers, like 1,500 divided by 30, give a quick estimate.
- Check division by multiplying: divisor times quotient plus remainder equals dividend.
- The meaning of the question decides whether to ignore or round up a remainder.

## What does it mean to divide whole numbers?

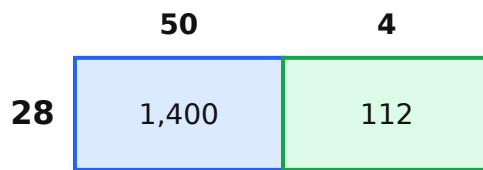
Division finds how many equal groups fit in a number or how many are in each group. Every division fact is linked to multiplication:  $3,600 \div 40 = 90$  because  $40 \times 90 = 3,600$ . Think of 3,600 as 360 tens and 40 as 4 tens, then  $360 \div 4 = 90$ .

### Dividend, divisor, quotient

In  $1,512 \div 28 = 54$ , the **dividend** 1,512 is the number being split, the **divisor** 28 is the size of each group, and the **quotient** 54 is the answer. A **remainder** is what is left when the groups do not fit evenly.

## How does an area model show division?

Draw a rectangle with height 28 and area 1,512. Take big chunks first.  $28 \times 50 = 1,400$  leaves  $1,512 - 1,400 = 112$ . Then  $28 \times 4 = 112$  uses the rest. The widths 50 and 4 are partial quotients, and  $50 + 4 = 54$ .



$$1,512 \div 28 = 54$$

Partial quotients 50 and 4 fill the rectangle.

## How do you use long division?

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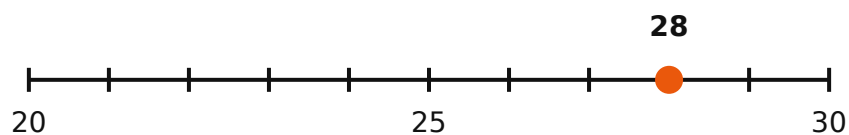
Long division records the same steps in a compact form.

$$\begin{array}{r}
 \textcolor{green}{54} \\
 \textcolor{brown}{28} \overline{) 1512} \\
 \underline{- 140} \phantom{0} \\
 112 \\
 \underline{- 112} \\
 0
 \end{array}$$

Long division of 1,512 by 28.

1. Estimate with compatible numbers: 1,512 is near 1,500 and 28 is near 30, so about 50.
2. Divide the first digits: 28 does not go into 1 or 15, so use 151.  $28 \times 5 = 140$  fits, and  $151 - 140 = 11$ .
3. Bring down the 2 to make 112.  $28 \times 4 = 112$ , and  $112 - 112 = 0$ .
4. Read the quotient digits 5 and 4: the answer is 54.

Check by multiplying:  $28 \times 54 = 1,512$ .



28 is close to 30, a friendly divisor.

## What do you do with a remainder?

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Suppose 925 photos go in albums of 12.  $925 \div 12 = 77$  with remainder 1, because  $12 \times 77 = 924$ . Whether you round up or drop the remainder depends on the question: 77 full albums, and one photo left over.

925 photos



77 full albums and 1 photo left.

| Question                                        | Remainder means |
|-------------------------------------------------|-----------------|
| How many full albums?                           | Ignore it: 77   |
| How many albums are needed to hold every photo? | Round up: 78    |

## Dividing Whole Numbers: frequently asked questions

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### What is the difference between a quotient and a remainder?

The quotient is the number of whole groups, or the size of each group. The remainder is what is left over after making as many equal groups as possible. The remainder is always less than the divisor.

### How do you divide by a two-digit number?

Estimate with compatible numbers, then use partial quotients or long division. Multiply the divisor by a friendly number, subtract, and repeat with what is left.

### Why is there a zero in my quotient?

A zero is written when the divisor does not go into the current part of the dividend. The zero holds the place so that the other digits keep their value.

### How do I check a division answer?

Multiply the quotient by the divisor and add the remainder. The result must equal the dividend. If it does not, look for a subtraction or place-value mistake.

### When do I round up a remainder?

Round up when everything must be placed, such as seats on buses for every student. Ignore the remainder when you only count full groups, such as full boxes.