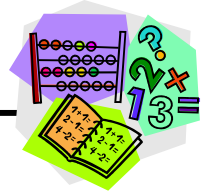


# Dividing Whole Numbers



Chad makes 48 cookies to share with 12 friends. How many cookies will each friend receive? To find the answer, you need to use division.

The division statement  $48 \div 12$  can be represented using the following methods.

**In number form:**

$$\begin{array}{c} \text{dividend} \rightarrow 48 \div 12 = 4 \leftarrow \text{quotient} \\ \uparrow \\ \text{divisor} \end{array}$$

**OR**

$$\begin{array}{r} \text{divisor} \rightarrow 12 \overline{) 48} \\ \underline{48} \\ 0 \end{array} \begin{array}{l} \leftarrow \text{quotient} \\ \leftarrow \text{dividend} \end{array}$$

The **dividend** is the number being divided.

The **divisor** is the number doing the dividing.

The **quotient** is the answer to a division question.

**In word form:** Forty-eight divided by twelve equals four.

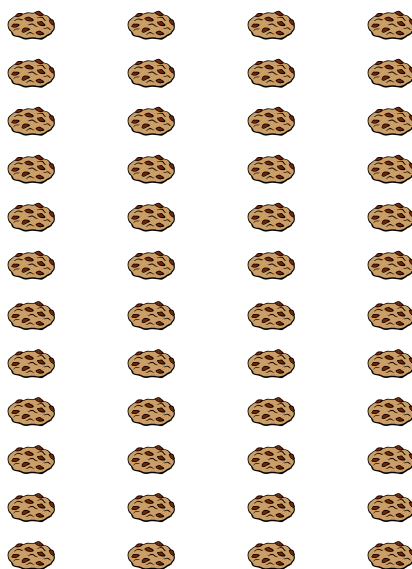
**OR**

Twelve divided into forty-eight equals four.

Many strategies can be used when dividing numbers, such as drawing, mind math, manipulatives, calculators or pencil and paper.

**Example**

The diagram shows 48 cookies organized into 4 groups of 12. The quotient is 4.



Entering  $48 \div 12 =$  on a calculator displays the answer of 4.

$$48 \div 12 = 4$$

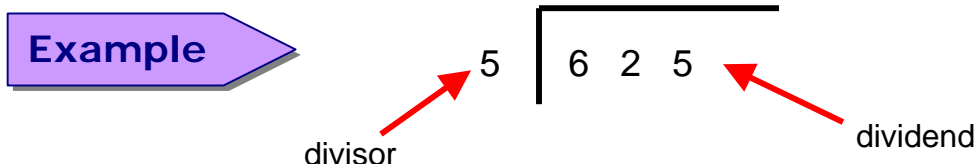
Whatever method you use, it is important to understand the process of division.

# The Process of Division

## Dividing Using Paper and Pencil

When using the pencil and paper method to divide numbers, follow these steps.

1. Place the numbers so that the dividend is under the division sign and the divisor is in front of the division sign as shown below.



2. Ask yourself how many times (think multiplication) will the divisor go into the dividend without going over.

$5 \times 1 = 5$   
 $5 \times 2 = 10$  (too high)

Five will divide into six one time without going over.

Place **1** directly above 6 in 625, since only the six was being divided by the divisor of five. This number now becomes part of the answer to the question.

**Five**, the product of  $5 \times 1$ , is placed under 6 in 625 and is subtracted from the six, resulting in **1**.

5      1  
5 | 6 2 5  
  5  
  —  
  1

If the divisor will not divide into the value of the dividend during **Step 2**, place a **zero** (0) in the quotient and bring down the next digit from the dividend.

3. Bring down the next digit in the dividend.

$$\begin{array}{r} 1 \\ 5 \overline{) 625} \\ \underline{5} \phantom{0} \\ 12 \phantom{0} \end{array}$$

4. Now divide 5 into 12. Estimate how many times 5 will divide into 12.

$$\begin{aligned} 5 \times 2 &= 10 \\ 5 \times 3 &= 15 \text{ (too high)} \end{aligned}$$

5. Repeat **Steps 2** and **3** until the final answer is reached.

$$\begin{array}{r} 12 \\ 5 \overline{) 625} \\ \underline{-5} \phantom{0} \\ 12 \phantom{0} \\ \underline{-10} \phantom{0} \\ 25 \phantom{0} \\ \underline{-25} \\ 0 \end{array}$$

$5 \times 2 = 10$

2 is placed in the quotient.

10 is placed under the dividend.

Subtracting  $12 - 10$  results in 2. The five is brought down.

|   |       |   |   |   |
|---|-------|---|---|---|
|   | 1     | 2 | 5 |   |
| 5 | 6 2 5 |   |   | $5 \times 5 = 25$<br><br>5 is placed in the quotient.<br><br>25 is placed under the dividend.<br><br>Subtract $25 - 25$ |
| - | 5     |   |   |   |
|   | 1     | 2 |   |   |
| - | 1 0   |   |   |   |
|   | 2     | 5 |   |   |
| - | 2 5   |   |   |   |
|   | 0     |   |   |   |

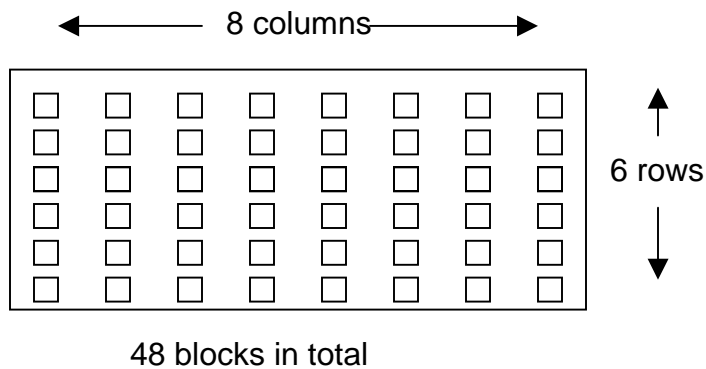
⇒  $625 \div 5 = 125$

## Dividing Using Manipulatives

You can also divide two numbers by using manipulatives or “Base 10 blocks.”

**Example** What is the quotient of  $48 \div 8$ ?

1. Count 48 blocks. Place them in 8 columns (8 is the divisor).
2. The quotient is the number of rows of blocks. Place blocks evenly into each column.



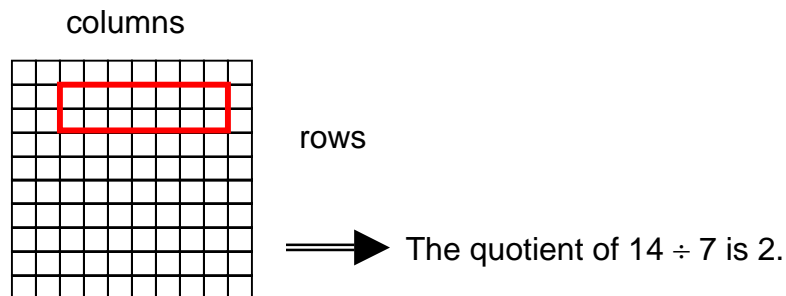
## Dividing Using $10 \times 10$ Grids or Geoboards

Grids or geoboards can be used to represent the division of numbers. Use a pencil or an elastic to create a rectangle or square with a total number of squares inside equal to the dividend. The length of the rectangle must be equal to the value of the divisor.

The **quotient** of the division statement is the **number of rows**.

### Example

What is the quotient of  $14 \div 7$ ?



## Dividing Using Hints for Dividing

There are a number of general rules that can help you determine whether a number is divisible by another number.

### Example

A number can be divided by 5 if it ends in 0 or 5. Therefore, 75 is divisible by 5.

These rules are listed in [Hints for Dividing](#).

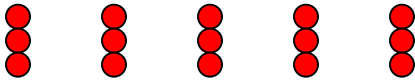


## Practice: Dividing Whole Numbers

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1. Write the numeric and word forms to represent the following counters.

a.



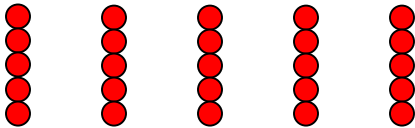
Numeric form:

\_\_\_\_\_

Word form:

\_\_\_\_\_

b.



Numeric form:

\_\_\_\_\_

Word form:

\_\_\_\_\_

2. Write each division statement in words.

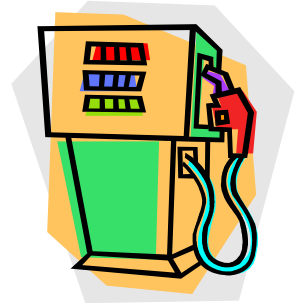
a.  $144 \div 12 = 12$

b.  $96 \div 3 = 32$

3. Use [hints for dividing](#) or another method to determine whether or not the following are evenly divisible. Be prepared to explain your method.

- a. Is 14 divisible by 2?
- b. Is 34 divisible by 6?
- c. Is 90 divisible by 3?
- d. Is 126 divisible by 9?
- e. Is 38 divisible by 5?
- f. Is 86 divisible by 3?
- g. Is 142 divisible by 6?
- h. Is 2450 divisible by 2?

4. Jackie keeps track of her gas use. Her gas tank holds 64 litres of gas. If Jackie can drive a total of 576 kilometres on one tank of gasoline, how many kilometres can she drive per litre?



5. Janine organizes afternoon snacks for the children at the daycare centre. Today's snack is plums. There are 16 children in the daycare centre and 48 plums. How many plums will each child get?





6. Kenji receives \$2.50 for each bag of leaves that he rakes. If Kenji earned \$40.00, how many bags of leaves did he rake?

7. Challenge a classmate to demonstrate division using grid paper and geoboards.



8. Kristi works at a flower shop. A customer comes in and orders 98 petunias. If each flat holds 7 petunias, how many flats will Kristi have to prepare?

9. Bernard wants to take friends to a movie. He has \$48.00. How many friends can he take if each ticket costs \$8.00?



## Dividing by Multiples of 10 Using Mind Math

You can estimate when you divide two numbers. When estimating, numbers can be **rounded** to a multiple of 10 to make calculations easier to perform in your head.

### Example

Sixty-two candies are to be divided between 19 students. Approximately, how many candies will each student receive?

Round 19 people to **20**.

Round 62 candies to **60**.

Mentally divide  $60 \div 20 = 3$

Each student will receive 3 candies.



When you are dividing by 10 or multiples of 10, such as 20, 80, 1000, you can remove one zero from the dividend and divisor for each zero in the divisor. Removing the zeroes makes the process of division easier.

### Examples

A)  $90 \div 30 =$

$$\begin{array}{r}
 90 \\
 (9 \times 10) \\
 (9 \times 10)
 \end{array}
 \div
 \begin{array}{r}
 30 = \\
 (3 \times 10) \\
 (3 \times 10)
 \end{array}$$
  

$$\begin{array}{r}
 (9 \times 10) \\
 10
 \end{array}
 \div
 \begin{array}{r}
 (3 \times 10) \\
 10 = 1
 \end{array}$$
  

$$\begin{array}{r}
 90 \\
 9
 \end{array}
 \div
 \begin{array}{r}
 30 = \\
 3 = 3
 \end{array}
 \times 1 = 3$$

You can remove the 10 from both numbers because the 10s divide and equal 1.

The answer is the same: 3.

**B)**  $140 \div 10$ , so  $14 \div 1 = 14$

**C)**  $600 \div 10$ , so  $60 \div 1 = 60$

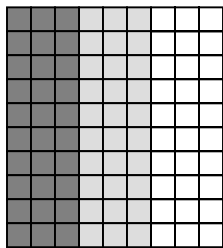
**D)**  $3200 \div 400$ , so  $32 \div 4 = 8$

Removing the zero is the same as moving the decimal in each dividend to the left.

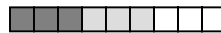
Another way of dividing multiples of 10 is with pictures.

**Example**

90 divided into groups of 30 = 3 groups



9 divided into groups of 3 = 3



**$90 \div 30$  is the same as  $9 \div 3 = 3$**



## Practice: Dividing Multiples of 10 Using Mind Math

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1. Angelina has received her first pay cheque. She has earned \$280.00. If Angelina earns \$7.00 per hour, how many hours did she work?
2. Use mind math strategies to solve the following. Explain the strategy you used in words.
  - a.  $300 \div 60$
  - b.  $1800 \div 300$
  - c.  $2400 \div 80$
3. Indicate how you would mentally divide each of the following numbers and be prepared to explain the process you used. The first question is an example.

a.  $8400 \div 20$

$$840\cancel{0} \div 2\cancel{0} = 420$$

I removed the zero from 20 and removed one zero from 8400. Then I divided 2 into 840.

b.  $960 \div 30$

c.  $1240 \div 40$



d.  $36\,000 \div 60$



## Verifying Answers in Division

When you are dividing, you can verify whether your answers are right using a variety of methods, such as opposite operations, mental mathematics, calculator, manipulatives and diagrams.

### Example

Harvesting wheat crops is done with a combine.

If the area of farmland to be combined is 2 000 000 m<sup>2</sup> and each pass of the combine covers 5000 m<sup>2</sup>, how many passes will Corey take to finish combining?



Corey calculated in her mind. The divisor has 3 zeros, so she removed 3 zeros from the dividend. She divided 5 into 2000 and got 400.

She checked her answer on a calculator by entering the following:



|   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | ÷ | 5 | 0 | 0 | 0 | = |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

The calculator displayed a result of:

400

Corey's mental calculation of 400 passes was correct!



## Practice: Verifying Answers in Division

---

1. For each of the following division questions, prove that the answers are correct using one of the following methods: opposite operation, mental mathematics, calculator, manipulatives or diagrams. Be prepared to explain the strategy you used.

a.  $16 \div 2 = 8$

b.  $49 \div 7 = 7$

c.  $30 \div 6 = 5$

d.  $8 \div 4 = 2$

e.  $100 \div 25 = 4$

f.  $66 \div 3 = 22$

g.  $40 \div 8 = 5$

h.  $52 \div 2 = 26$

2. Rewrite each multiplication statement as a division statement.

E.g.,  $7 \times 6 = 42$ ,  $42 \div 7 = 6$

a)  $4 \times 3 = 12$  \_\_\_\_\_

b)  $7 \times 5 = 35$  \_\_\_\_\_

c)  $6 \times 1 = 6$  \_\_\_\_\_

d)  $9 \times 2 = 18$  \_\_\_\_\_

e)  $4 \times 8 = 32$  \_\_\_\_\_

3. Solve the following word problem. Check the accuracy of your solution using the opposite operation.

Jenny earns \$7.50/h and worked for 12 hours.  
How much money did Jenny earn?

| Solution | Check |
|----------|-------|
|          |       |