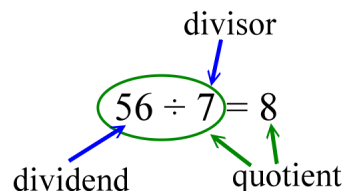


# Division Terms and Division with Zero

**Study the terms in the picture.**

Notice: both the expression  $56 \div 7$  and its answer are called “the quotient”!

You can call “ $56 \div 7$ ” the quotient written, and the 8 as the quotient solved.



1. What is missing from these divisions: the dividend, the divisor, or the quotient? Complete.

a.  $80 \div \underline{\hspace{2cm}} = 40$  The                                  is missing.

b.  $\underline{\hspace{2cm}} \div 7 = 5$  The                                  is missing.

c.  $120 \div 10 = \underline{\hspace{2cm}}$  The                                  is missing.

2. Write the division problem. Solve for the unknown.

a. The divisor is 7, the dividend is $x$ , and the quotient is 3.	<u>        </u> $\div$ <u>        </u> = <u>        </u> ; $x = \underline{\hspace{2cm}}$
b. The dividend is 140, the divisor is $y$ , and the quotient is 7.	<u>        </u> $\div$ <u>        </u> = <u>        </u> ; $y = \underline{\hspace{2cm}}$
c. The quotient is $z$ , the divisor is 5, and the dividend is 150.	<u>        </u> $\div$ <u>        </u> = <u>        </u> ; $z = \underline{\hspace{2cm}}$

3. Make up:

<p><b>a.</b> three division problems with a quotient of 6</p> <p><u>        </u> <math>\div</math> <u>        </u> = <u>        </u></p> <p><u>        </u> <math>\div</math> <u>        </u> = <u>        </u></p> <p><u>        </u> <math>\div</math> <u>        </u> = <u>        </u></p>	<p><b>b.</b> three division problems with a dividend of 24</p> <p><u>        </u> <math>\div</math> <u>        </u> = <u>        </u></p> <p><u>        </u> <math>\div</math> <u>        </u> = <u>        </u></p> <p><u>        </u> <math>\div</math> <u>        </u> = <u>        </u></p>
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4. Fill in the tables. Remember, the product of two numbers means they are multiplied.

Numbers	Product (written)	Product (solved)	Quotient (written)	Quotient (solved)
12 and 3	$12 \times 3$	36		
10 and 5				
20 and 4				
100 and 10				

### Division with zero

We check a division problem by multiplication.

Is  $0 \div 3 = 0$ ? Check if  $0 \times 3 = 0$ . Yes, it is.

Is  $0 \div 11 = 0$ ? Check if  $0 \times 11 = 0$ . Yes, it is.

Is  $3 \div 0 = 0$ ? Check if  $0 \times 0 = 3$ . It is **not**.

Is  $3 \div 0$  perhaps 3? Check if  $0 \times 3 = 3$ . It is **not**.

In fact, dividing by zero is a real problem.

No matter what number you suggest as an answer to the problem  $3 \div 0$ , the multiplication check won't work because you'll end up multiplying by zero, and can never get the dividend as an answer.

That is why division **by zero** is said to be an *undefined*—we cannot define a sensible answer. You can, however, divide zero by any number (except zero). The answer is always zero.

### What about $0 \div 0$ ?

We cannot really determine any single answer, because all of these could work:

If  $0 \div 0 = 1$ , then check:  $0 \times 1 = 0$  works.

If  $0 \div 0 = 7$ , then check:  $0 \times 7 = 0$  works.

If  $0 \div 0 = 0$ , then check:  $0 \times 0 = 0$  works.

So  $0 \div 0$  is usually said to be an *indeterminate* form since we cannot determine an answer to it.

**Division by zero is undefined—you cannot do it.**

5. Divide. Mark off the problem if it is impossible to do.

a. $64 \div 8 =$ _____	b. $55 \div 5 =$ _____	c. $50 \div 1 =$ _____	d. $0 \div 1 =$ _____
$0 \div 8 =$ _____	$6 \div 0 =$ _____	$0 \div 10 =$ _____	$1 \div 1 =$ _____
$32 \div 32 =$ _____	$7 \div 7 =$ _____	$0 \div 0 =$ _____	$9 \div 0 =$ _____

6. Find what the unknown stands for.

a. $64 \div x = 1$ $x =$ _____	b. $35 \div T = 35$ $T =$ _____	c. $0 \div x = 0$ $x =$ _____	d. $y \div 18 = 1$ $y =$ _____
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7. Make up:

a. two divisions with a quotient of 1  ____ $\div$ ____ = ____  ____ $\div$ ____ = ____	b. two divisions with a dividend of 0  ____ $\div$ ____ = ____  ____ $\div$ ____ = ____
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Mark had two division problems with the same dividend and the same quotient, yet the divisors were different. How could that be?

Puzzle Corner