

Multiplying and Dividing Decimals: math lesson, Grade 5 – download the PDF

Decimals are everywhere: prices, race times, recipes, and the distance your drone flies. In this chapter you will learn how to multiply and divide decimals with confidence, using place value, pictures, and a few smart checks so your answer always makes sense.

1. Multiplying decimals by powers of 10

The powers of 10 are 10, 100, 1,000, and so on. Our number system is built on tens, so multiplying by a power of 10 does not change the digits. It only changes *where each digit sits*. Every digit moves to a place that is 10 times bigger, which means one place to the left for each factor of 10.

	Hundreds	Tens	Ones	Tenths	Hundredths
Start			4	.	6
Result		4	6	.	0

Note: The diagram shows arrows indicating the movement of digits from the 'Start' row to the 'Result' row. An arrow points from the 'Ones' place (4) to the 'Tens' place (4). Another arrow points from the 'Tenths' place (6) to the 'Ones' place (6). A label 'x 10' is placed between the arrows, indicating the multiplication factor.

D Multiplying by 10, 100, 1,000

When you multiply by 10, move every digit 1 place to the left (the decimal point seems to move 1 place to the right). For 100 move 2 places, for 1,000 move 3 places. Write zeros in empty places.

E Example 1

Compute $0.043 \times 1,000$ and 7.25×10 .

$0.043 \times 1,000$: three places to the right gives **43**. So $0.043 \times 1,000 = 43$.

7.25×10 : one place to the right gives **72.5**.

Careful

Multiplying by 10 does not mean “add a zero.” That trick works for whole numbers only. For 3.4×10 , the answer is **34**, not **3.40**.

2. Dividing decimals by powers of 10

Dividing is the opposite of multiplying, so every digit moves to a place that is 10 times smaller, one place to the right for each factor of 10.



Dividing by 10, 100, 1,000

Dividing by 10 moves every digit 1 place to the right. Dividing by 100 moves 2 places, and dividing by 1,000 moves 3 places. Add zeros as placeholders when needed.

For example, $6.3 \div 100 = 0.063$, because the digits 6 and 3 each move two places to the right and we need a zero as a placeholder in the tenths place. Also $820 \div 1,000 = 0.82$.

Here is a useful link: multiplying by 0.1 is the same as dividing by 10, and multiplying by 0.01 is the same as dividing by 100.

3. Multiplying a decimal by a whole number

A decimal times a whole number is repeated addition: 3×0.4 means 0.4 added three times, which is 1.2. For bigger numbers, use this method.



Method

1. Ignore the decimal point and multiply as if both numbers were whole numbers.
2. Count the digits after the decimal point in the decimal factor.
3. Put the decimal point in the product so it has the same number of decimal places.

E**Example 2**

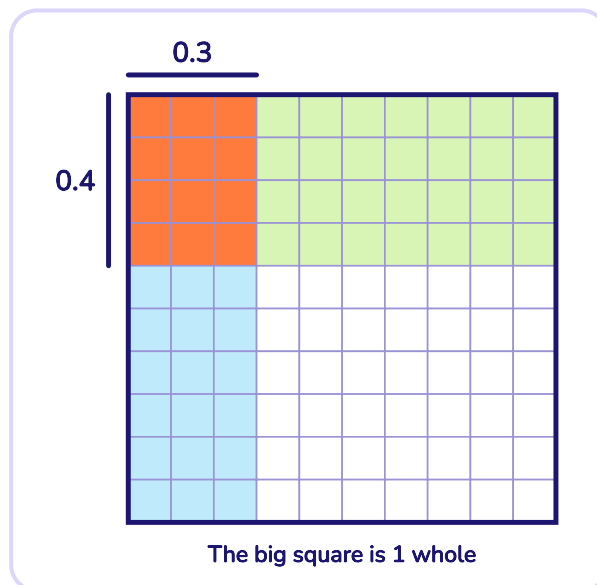
Compute 5.6×3 .

Think $56 \times 3 = 168$. The decimal factor 5.6 has one decimal place, so the product has one decimal place: **16.8**.

Check with an estimate: **5.6** is close to **6**, and $6 \times 3 = 18$. Our answer 16.8 is close to 18, so it is reasonable.

4. Multiplying decimals with models

An area model shows why decimal multiplication works. Picture a square that stands for 1 whole. Cut it into 10 columns and 10 rows, so it has 100 little squares. Each little square is one hundredth, or 0.01.



To show 0.3×0.4 , take 3 tenths of the width and 4 tenths of the height. The overlap is a rectangle of 3 columns by 4 rows, so it contains $3 \times 4 = 12$ little squares. That is 12 hundredths.

E**Example 3**

Find 0.3×0.4 with the model.

The orange rectangle has 12 of the 100 squares. So $0.3 \times 0.4 = \frac{12}{100} = 0.12$.

Notice that tenths times tenths gives hundredths. This is why the product of two numbers with one decimal place each has two decimal places.

5. Placing the decimal point in a product

When both factors are decimals, the rule from Section 3 still works. Count all the decimal places in both factors together.

P**Counting decimal places**

The number of decimal places in the product equals the number of decimal places in the first factor plus the number in the second factor (you may then drop zeros at the end).

E**Example 4**

Compute 1.4×0.3 .

Multiply the whole numbers: $14 \times 3 = 42$. There is 1 decimal place in 1.4 and 1 in 0.3, so we need 2 decimal places: **0.42**.



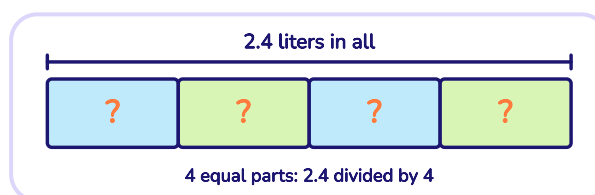
Zyro's tip

On my home planet we always estimate first! Round each factor to an easy number, multiply, and compare. If your exact answer is far from the estimate, the decimal point is in the wrong place.

An estimate is also a great way to catch mistakes. If 4.9×5.1 gives you 2.499 or 249.9, you can tell something is wrong, because $5 \times 5 = 25$ and the product must be close to 25.

6. Dividing a decimal by a whole number

Dividing a decimal by a whole number works like dividing whole numbers. The only extra step is to put the decimal point in the quotient directly above the decimal point in the dividend.



Method

1. Write the decimal point in the quotient right above the decimal point in the dividend.
2. Divide as you would with whole numbers, place by place.
3. If there is a remainder, write a zero at the end of the dividend and keep dividing.
4. Multiply the answer by the divisor to check.

E**Example 5**

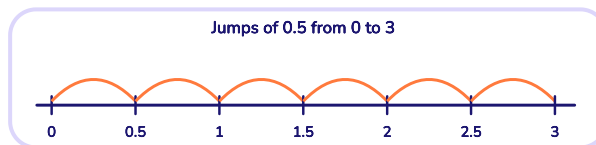
Compute $2.4 \div 4$ and $0.84 \div 4$.

2.4 is 24 tenths. **24 tenths** $\div 4 = 6$ tenths, so $2.4 \div 4 = 0.6$. Check: $0.6 \times 4 = 2.4$.

0.84 is 84 hundredths. **84** $\div 4 = 21$, so the answer is 21 hundredths:
 $0.84 \div 4 = 0.21$.

7. Dividing a whole number by a decimal

How many jumps of 0.5 fit in 3? Each jump is half a unit, so there are 2 jumps in every whole, and 6 jumps in 3.



That means $3 \div 0.5 = 6$. The answer is bigger than 3 because we are splitting 3 into pieces smaller than 1.

M**Method: make the divisor a whole number**

Multiply the dividend and the divisor by the same power of 10 so the divisor becomes a whole number. The quotient does not change, because you are making an equivalent division.

E Example 6

Compute $3 \div 0.25$.

Multiply both numbers by 100: $3 \div 0.25 = 300 \div 25 = 12$. Check: $12 \times 0.25 = 3$.

Careful

Dividing by a number smaller than 1 makes the answer bigger, not smaller. Dividing by 0.1 is the same as multiplying by 10.

8. Decimal word problems

Real problems mix everything you know. Read the story, decide which operation fits, estimate, solve, and write a sentence with the unit.

E Example 7

A school ruler is 12 inches long. One inch is 2.54 centimeters. How long is the ruler in centimeters?

Multiply: 12×2.54 . We compute $12 \times 254 = 3,048$, and 2.54 has two decimal places, so the product is **30.48**. The ruler is 30.48 cm long.

Questions such as “How many groups?” or “What is each share?” point to division. Questions such as “How much for several equal items?” point to multiplication. When a problem has two steps, write each step on its own line so you never lose track.

Key takeaways

- Multiplying by 10, 100, or 1,000 moves each digit 1, 2, or 3 places to the left; dividing moves them to the right.
- To multiply decimals, multiply as whole numbers, then give the product as many decimal places as both factors have together.
- An area model on a 10 by 10 grid shows that tenths times tenths gives hundredths.
- To divide a decimal by a whole number, line up the decimal point in the quotient and divide place by place.
- To divide by a decimal, multiply both numbers by the same power of 10 to make the divisor a whole number.
- Always estimate first, and check with the opposite operation.



Test yourself: quick challenge for Grade 5

[Change level](#)

Level : **Grade 5**

6 random questions, instant feedback.



Start the challenge



Speed drill for Grade 5: how many in 60 seconds?

 Keep exploring with Zyro

 Math practice

Multiplying and Dividing Decimals: math practice, Grade 5

 Math tests

Multiplying and Dividing Decimals: math test, Grade 5

 Math quizzes

Multiplying and Dividing Decimals: math quiz, Grade 5

 Math practice

Adding and Subtracting Fractions: math practice, Grade 5

 Math practice

Multiplying and Dividing Fractions: math practice, Grade 5

 Math tests

Adding and Subtracting Fractions: math test, Grade 5

Zyro vous emmène sur nos sites partenaires

Embarquez pour d'autres planètes du savoir et leurs applis.

Décollage