

Grade 5 to 6
Examples, Online Video
and
Extra Practice Links



Multiplication of Whole Numbers:

Example: 426×46

Solve first by rewriting the problem from a horizontal representation into a vertical.

$$\begin{array}{r} 426 \\ \times 46 \\ \hline \end{array}$$

We are going to separate the problem by multiplying 426 by 40 and 426 by 6 and add the answers together

$$\begin{array}{r} 426 \\ \times 6 \\ \hline \end{array} + \begin{array}{r} 426 \\ \times 40 \\ \hline \end{array}$$

Then multiply 6 by 426

$$\begin{array}{r} 426 \\ \times 46 \\ \hline \end{array}$$

Ones: $6 \times 6 = 36$
Tens: $6 \times 2 = 12$
Hundreds: $6 \times 4 = 24$

Next use the ones place in answers of each of the above calculations. If there are any numbers in the tens place, add that number to the next value.

$$\begin{array}{r} 3 \\ 426 \\ \times 46 \\ \hline \end{array}$$

Ones: $6 \times 6 = 36$ Write down the 6 and "carry" the 3 to above the Tens place.

Continue this process

$$\begin{array}{r} 13 \\ 426 \\ \times 46 \\ \hline 56 \end{array}$$

Tens: $6 \times 2 = 12$ add the "carried" 3 to the Tens place answer: $12 + 3 = 15$ and write down the 5 and carry the 1 to above the Hundreds place.

Next work with the Hundreds place

$$\begin{array}{r} 13 \\ 426 \\ \times 46 \\ \hline 2556 \end{array}$$

Hundreds: $6 \times 4 = 24$ add the "carried" 1 to the Hundreds place answer: $24 + 1 = 25$ and write down the 25 because there are no more numbers to multiply on this row.

To finish this we need to multiply 426 by the 4. We are actually multiplying by 40. When you multiply by a number ending in zero a shortcut is to add a zero to the end of the number for a "place holder".

$$\begin{array}{r} 12 \\ 426 \\ \times 46 \\ \hline 2556 \\ +17040 \\ \hline 19596 \end{array}$$

Ones: $4 \times 6 = 24$ write the 4 and "carry" the 2
Tens: $4 \times 2 = 8$ add the 2 to the 8=10 write the 0 and carry the 1
Hundreds: $4 \times 4 = 16$ add the 1 to the 16=17 and write the 17 because there are no more number to multiply.
Then add the numbers together to get the final answer.

Other Links

Extra practice: [Multi-digit multiplication](#)

Videos:

[Multiplying multiple digit numbers](#)

<http://www.virtualnerd.com/middle-math/number-algebraic-sense/whole-number-operations/long-multiplication-method>

Long Division: Single digit division, with remainder

$$456 \div 5$$

$$5 \overline{)456}$$

Rewrite with the long division symbol

$$5 \overline{)456}$$

4 is not divisible by 5 so we need to see how many times 45 is divisible by 5

$$5 \overline{)456}$$

$$\begin{array}{r} -45 \\ \hline 06 \end{array}$$

Multiply 9×5 , subtract and bring down the 6

$$5 \overline{)456}$$

$$\begin{array}{r} 91 \\ -45 \\ \hline 06 \end{array}$$

6 is divisible by 5. It is divisible 1 time

$$5 \overline{)456}$$

$$\begin{array}{r} 91 \\ -45 \\ \hline 06 \\ -5 \\ \hline 1 \end{array}$$

Multiply 1×5 , subtract. There are no more numbers to bring down and 1 is not divisible by 5, so it is the remainder.

Answer 91 R 1

Division by a 2 digit number

$$7182 \div 42$$

$$42 \overline{)7182}$$

Rewrite with the long division symbol

$$42 \overline{)7182}$$

7 is not divisible by 42 so we need to see how many times 71 is divisible by 42

$$42 \overline{)7182}$$

$$\begin{array}{r} 1 \\ -42 \\ \hline 298 \end{array}$$

Multiply 42×1 , subtract, which equals 29. 29 is less than 42 so and bring down the 8

$$42 \overline{)7182}$$

$$\begin{array}{r} 17 \\ -42 \\ \hline 298 \\ -294 \\ \hline 42 \end{array}$$

298 is divisible by 42. $40 \times 7 = 280$ so we should be good to multiply 42×7

$$42 \overline{)7182}$$

$$\begin{array}{r} 17 \\ -42 \\ \hline 298 \\ -294 \\ \hline 42 \end{array}$$

Subtract, which equals 4. 4 is less than 42 so bring down the 2

$$42 \overline{)7182}$$

$$\begin{array}{r} 171 \\ -42 \\ \hline 298 \\ -294 \\ \hline 42 \\ -42 \\ \hline 0 \end{array}$$

Multiply 42×1 , subtract, which equals 29. 29 is less than 42 so and bring down the 8

Answer: 171 R 0 or 171 because there is no remainder

Videos: [Dividing by 2 digits: 9815 ÷ 65](#); [Dividing by 2 digits: 7182 ÷ 42](#)

Extra Practice: [Basic multi-digit division](#) (long division not necessary), [Division by 2-digits](#)

Operations with Decimals:

Adding decimals

Line up the decimals, add a zero place holder for anything that doesn't match up. Then add/carry to find your answer.

$$0.822 + 5.65$$

$\begin{array}{r} 0.822 \\ +5.65 \\ \hline \end{array}$	Line up the decimals	→	$\begin{array}{r} 0.822 \\ +5.650 \\ \hline \end{array}$	Add zero place holder	→	$\begin{array}{r} 1 \\ 0.822 \\ +5.650 \\ \hline 6.472 \end{array}$
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Subtracting decimals

$$9.005 - 3.6$$

$\begin{array}{r} 9.005 \\ -3.6 \\ \hline \end{array}$	Line up the decimals	→	$\begin{array}{r} 9.005 \\ -3.600 \\ \hline \end{array}$	Add zero place holder	→	$\begin{array}{r} 8 \quad 10 \\ \cancel{9}.005 \\ -3.600 \\ \hline 5.405 \end{array}$	Borrowed from the 9 to make the 0 a ten
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Videos:

[Adding decimals: 9.087 + 15.31](#), [Adding decimals: 0.822 + 5.65](#), [Adding three decimals](#),

[Subtracting decimals: 9.57 - 8.09](#), [Subtracting decimals: 10.1 - 3.93](#)

Extra Practice

[Add decimals 1](#), [Add decimals 2](#), [Add decimals 3](#), [Add decimals 4](#), [Add decimals 5](#), [Add decimals 6](#)

[Subtract decimals 1](#), [Subtract decimals 2](#), [Subtract decimals 3](#), [Subtract decimals 4](#), [Subtract decimals 5](#),
[Subtract decimals 6](#), [Subtract decimals 7](#), [Subtract decimals 8](#)

Multiplying decimals: Count the total number of decimals, multiply the numbers like there are no decimals in the problem, and then move the decimal to the left at the end of the problem the total number of decimals from the beginning.

Multiply 2.91×3.2

$$\begin{array}{r}
 2.91 \\
 \times 3.2 \\
 \hline
 \end{array}
 \quad
 \begin{array}{l}
 \text{(3 decimal} \\
 \text{places)}
 \end{array}
 \quad
 \xrightarrow{\quad}
 \begin{array}{r}
 \overset{1}{2.91} \\
 \times 3\overset{2}{2} \\
 \hline
 582
 \end{array}
 \quad
 \begin{array}{l}
 \text{Multiply} \\
 \text{2.91 by 2}
 \end{array}
 \quad
 \xrightarrow{\quad}
 \begin{array}{r}
 \overset{2}{2.91} \\
 \times 3\overset{2}{2} \\
 \hline
 582 \\
 8730
 \end{array}
 \quad
 \begin{array}{l}
 \text{Multiply} \\
 \text{2.91 by} \\
 \text{30}
 \end{array}
 \quad
 \xrightarrow{\quad}
 \begin{array}{r}
 2.91 \\
 \times 3.2 \\
 \hline
 \overset{1}{1} \\
 582 \\
 +8730 \\
 \hline
 9312
 \end{array}
 \quad
 \begin{array}{l}
 \text{Add } 582 + 8730. \\
 \text{Make sure to carry} \\
 \text{when necessary}
 \end{array}$$

9312 $\xrightarrow{\quad}$ 9.312 (moved the decimal places to the left three places because of the original problem)

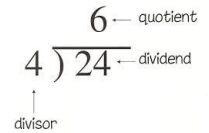
Videos:

[Intro to multiplying decimals](#), [Multiplying decimals: place value](#)

Extra Practice:

[Multiply decimals 1](#), [Multiply decimals 2](#), [Multiply decimals 3](#)

Dividing Decimals: Move the decimal to the right in the divisor, move the decimal in the dividend the same number of place. Place the decimal place in the correct position in the quotient. (Very important to be neat and organized with the division.)



$$6.3 \div 0.25$$

$$0.25 \overline{)6.3}$$



$$25 \overline{)630.0}$$

Moved the decimal place two places and added the decimal at the end. You can add as many zeros at the end of a decimal



$$25 \overline{)630.0} \quad 2$$

There are 2 25's in 63

$$\begin{array}{r} 2 \\ 25 \overline{)630.0} \\ \underline{-50} \\ 13 \end{array}$$

Multiply, subtract and bring down the next number

$$\begin{array}{r} 2 \\ 25 \overline{)630.0} \\ \underline{-50} \\ 130 \end{array}$$

There are 5 25's in 130

$$\begin{array}{r} 25 \\ 25 \overline{)630.0} \\ \underline{-50} \\ 130 \\ \underline{-125} \\ 50 \end{array}$$

Multiply, subtract and bring down again if there is a remainder, keep adding zeros if needed.

$$\begin{array}{r} 25.2 \\ 25 \overline{)630.0} \\ \underline{-50} \\ 130 \\ \underline{-125} \\ 50 \\ \underline{-50} \\ 0 \end{array}$$

Video: [Dividing whole numbers to get a decimal](#)

Tutorial: [Dividing Decimals](#) (gives many examples with feedback)

Extra Practice:

[Divide decimals 1](#), [Divide decimals 2](#), [Divide decimals 3](#), [Divide decimals 4](#), [Divide decimals 5](#), [Divide decimals 6](#), [Divide decimals 7](#), [Divide decimals 8](#)

Equivalent Fractions

Simplify $\frac{45}{81}$

If you write all of the factors of 45 and 81

45: 1, 3, 5, 9, 15, 45

81: 1, 3, 9, 27, 81

The greatest common factor of both numbers is 9. So

$$\frac{45}{81} = \frac{5 \times 9}{9 \times 9} = \frac{5 \cancel{\times 9}}{9 \times 9} = \frac{5}{9}$$

Videos:

[Intro to equivalent fractions](#)

[More on equivalent fractions](#)

[Equivalent fractions and different wholes](#)

Extra Practice

[Equivalent fractions](#)

[Equivalent fractions and different wholes](#)

Fractions

Converting mixed numbers and improper fractions

An improper fraction is a fraction where the numerator is larger than the denominator

Rewrite the following mixed number as an improper fraction.

Multiply the denominator and the whole number together and then add the numerator of the fraction. Keep the denominator the same

$$3\frac{2}{7} =$$

$$\frac{3 \times 7 + 2}{7} =$$

$$\frac{21 + 2}{7} =$$

$$\frac{22}{7}$$

Multiply the denominator by the whole number and add to the numerator

Multiply the $3 \times 7 = 21$ and replace

Add $21 + 2$ and rewrite

A mixed number is a whole number and a fraction added together written as one number $3\frac{2}{7}$

To convert from a improper fraction to a mixed number”

$$\frac{45}{8} =$$

$$\frac{40 + 5}{8} =$$

$$\frac{40}{8} + \frac{5}{8} =$$

$$5 + \frac{5}{8} =$$

$$5\frac{5}{8}$$

8 goes into 45, 5 times.
 $8 \times 5 = 40$

Separate the fractions to make it easier to simplify

Simplify $\frac{40}{8} = 5$

Simplify by removing the addition sign

Videos:

[Rewriting mixed numbers as improper fractions](#)

[Rewriting improper fractions as mixed numbers](#)

Extra Practice:

[Rewrite mixed numbers and improper fractions](#)

Adding and Subtracting Fractions and Mixed Numbers

The denominators must be the same.

1. If the denominators **are** the same. Add or subtract the numerators but **KEEP** the denominator the same. Then reduce

$$\frac{7}{8} + \frac{5}{8} = \frac{7+5}{8} = \frac{12}{8} = \frac{3(4)}{2(4)} = \frac{3}{2}$$

Videos:

Adding fractions with like denominators—<https://youtu.be/EJjnEau6aeI>

Adding mixed numbers with like denominators—<https://youtu.be/pxX07gUbIQQ>

Subtracting fractions with like denominators—https://youtu.be/UbUdyE1_b9g

Subtracting mixed numbers with like denominators— <https://youtu.be/zm3TXDZrifU>

Extra Practice: Click the links for the extra Practice

[Adding fractions with like denominators](#)

[Subtracting fractions with like denominators](#)

[Adding and subtracting mixed numbers with like denominators](#)

2. If the denominators are not the same. Find a common denominator by multiplying one or more of the fractions by a number that makes both denominators the same. Start with the larger number and multiply it by 2 check to see if it is divisible by the other number. If the answer is no then, keep multiplying by 3, 4, 5, and so on until the answer is yes.

$$\frac{4}{5} - \frac{3}{4}$$

$$\begin{aligned} \frac{4}{5} - \frac{3}{4} &= \frac{4(?)}{5(?)} - \frac{3(?)}{4(?)} = \frac{4(4)}{5(4)} - \frac{3(5)}{4(5)} \\ &= \frac{16}{20} - \frac{15}{20} = \frac{16-15}{20} = \frac{1}{20} \end{aligned}$$

Videos:

[Adding fractions with unlike denominators](#)

[Subtracting fractions with unlike denominators](#)

[Adding mixed fractions with unlike denominators](#)

[Subtract mixed fractions with unlike denominators](#)

[Adding mixed fractions with unlike denominators with regrouping](#)

[Subtracting mixed fractions with unlike denominators with regrouping](#)

Extra Practice

[Adding fractions with unlike denominators](#)

[Subtracting fractions with unlike denominators](#)

[Adding and subtracting mixed fractions with unlike denominators](#)

[Adding and subtracting mixed fractions with unlike denominators with regrouping](#)

Common multiple: use the larger number and multiply until you can divide the smaller number evenly (no decimal)

$$5 \times 2 = 10 \quad 10 \div 4 = 2.5 \text{ No}$$

$$5 \times 3 = 15 \quad 15 \div 4 = 3.75 \text{ No}$$

$5 \times 4 = 20 \quad 20 \div 4 = 5 \text{ Yes}$ Use the fact that the denominator must be 20.

For the first fraction: what number do I have to multiply 5 by to get 20? Answer: 4. Then multiply $\frac{4}{5}$ by $\frac{4}{4}$.

For the second fraction: What number do I have to multiply 4 to get 20? Answer: 5 Then multiply $\frac{3}{4}$ by $\frac{5}{5}$.