



# Decimals - Worksheet

A **decimal** is a fraction which is written with a decimal point separating the whole number from the fraction and based on number ten, tenth part and powers of ten. The digit on the lefthand side represents the whole number and the digit at the right gives the tenth fraction. Any number can be represented through decimal.

## Example

**1.2** → This represents 1 whole and  $\frac{2}{10^{\text{th}}}$  of something.

**24.725** → This number represents 24 whole units, and the value of '7' is a tenth, value of '2' is hundredth and value of '5' is a thousandth of a unit.

## Types of Decimals

Exact or Terminating decimals: These are decimal numbers which are terminated after few decimal places. e.g., 0.5, 0.125.

Repeating (recurring) decimals: These are decimals which have recurring sets of numbers (also referred as period) after the decimal point.

E.g., 0.3333333..., 0.666666..., 3.217217217....

Some recurring decimals are also mixed in nature with both irregular numbers and a period.

E.g., 0.1666666....

Other: These are decimals which are neither terminating nor repeating in nature.

E.g.,  $\pi = 3.14159265...$

## Writing Decimals

Decimals are written with the decimal point while the fraction in tenth is written on the right-hand side.

So,  $\frac{1}{10} = 0.1$

Whereas,  $\frac{1}{100} = 0.01$ ;  $\frac{1}{1000} = 0.001$

Hence, the denominator ( $10^{\text{th}}$ ,  $100^{\text{th}}$  or  $1000^{\text{th}}$ ) determines how many zeros would be after the point before writing the numerator.



## Converting decimals to fractions

**Method:** Divide the decimal by 1 and multiply both numerator and denominator with 10 for each digit of the numerator. Lastly simplify the fraction.

Example

$$0.24 = \frac{0.24}{1} = \frac{0.24 \times 100}{1 \times 100} = \frac{24}{100} = \frac{6}{25}$$

## Converting fractions to decimals

**Method:** The numerator of the fraction is divided by its denominator to convert it into a decimal.

Example

$$\frac{3}{5} = 3 \div 5 = 0.60$$

## Addition and subtraction of decimals

**Method:** To add or subtract decimals, the decimal points of the numbers need to be aligned and worked on separately.

Example

$$4.25 + 2.35$$

$$4.25 = 4 + 0.2 + 0.05$$

$$2.35 = 2 + 0.3 + 0.05$$

Hence,

$$4.25 + 2.35 = 4 + 0.2 + 0.05 + 2 + 0.3 + 0.05 = 6 + 0.5 + 0.1 = 6.6$$

Example

$$7.62 - 3.52$$

$$7.62 = 7 + 0.6 + 0.02$$

$$3.52 = 3 + 0.5 + 0.02$$

Hence,

$$\begin{aligned} 7.62 - 3.52 &= (7 + 0.6 + 0.02) - (3 + 0.5 + 0.02) = 7 + 0.6 + 0.02 - 3 - 0.5 - 0.02 \\ &= 4 + 0.1 - 0 = 4.1 \end{aligned}$$



## Multiplication of decimals

**Method:** Multiplication of decimals follow the same method as regular multiplication of whole numbers, but the decimal points need to be aligned. Depending on the number of digits after the decimal point in the question, the answer number would also have the same number of digits after decimal.

### Example

$$0.3 \times 2.5$$

Multiply the numbers without the decimal points:

$$03 \times 25 = 75$$

Both 0.3 and 2.5 have 1 decimal place so the answer should have 2 decimal places.

So,

$$0.3 \times 2.5 = 0.75$$

### Example

$$6.36 \times 3.5$$

Multiply the numbers without the decimal points:

$$636 \times 35 = 22260$$

6.36 has 2 decimal place and 3.5 has 1 decimal place, so the answer should have 3 decimal places.

So,

$$6.36 \times 3.5 = 22.260 \cong 22.26$$

## Division of decimals

**Type 1:** Dividing a decimal with a whole number:

**Method:** The division is done as per regular method while keeping the decimal points aligned.

### Example

$$5.50 \div 5$$

Let's do the division without the decimal points:

$$550 \div 5 = 110$$

5.50 has 2 decimal places, so the answer should have 2 decimal places.

So,

$$5.50 \div 5 = 1.10$$



Example

Let's consider another number:

$$65.4 \div 5$$

Let's do the division without the decimal points:

$$\begin{array}{r} 1308 \\ 5 \overline{) 654} \\ \underline{15} \\ 15 \\ \underline{40} \\ 40 \\ \underline{0} \end{array}$$

So,

$$654 \div 5 = 1308$$

Here note that if the decimal place is only one digit after the point (tenth place), we need to consider there is an additional '0' to the right (in the one place). This essentially doesn't change the value of the decimal.

$$\text{So, } 65.4 = 65.40$$

65.40 has 2 decimal places, so the answer should have 2 decimal places.

So,

$$65.4 \div 5 = 13.08$$

**Type 2:** Dividing a decimal with another decimal:

**Method:** You need to convert the denominator to a whole number while multiplying the numerator and denominator with the same number and keeping the fractions equivalent.

To change the denominator to a whole number multiply it by 10 for each digit after the point. e.g. to convert 0.25 multiply it with (10 × 10 = 100). And multiply the numerator with the same.

And then follow the regular division method.

Example

$$5.4 \div 0.25$$

$$\frac{5.4}{0.25} = \frac{5.4 \times 100}{0.25 \times 100} = \frac{540}{25}$$

Let's do the division with the regular method:



$$\begin{array}{r} 21 \\ 25 \overline{) 540} \\ \underline{50} \\ 40 \\ \underline{25} \\ 15 \end{array}$$

So the answer is 21 R 15 if regular method is followed. But we can proceed further by putting a decimal point after 21 and bringing a '0' at the right of 15.

$$\begin{array}{r} 21.6 \\ 25 \overline{) 540} \\ \underline{50} \\ 40 \\ \underline{25} \\ 150 \\ \underline{150} \\ 0 \end{array}$$

So,  $5.4 \div 0.25 = 21.6$



## Practice Exercises

### Question 1:

Convert the fractions to decimals:

No.	Fraction	Decimal
1	$4/5$	
2	$7/30$	
3	$9/59$	
4	$40/89$	
5	$3/8$	

### Question 2:

Convert these decimals into fractions:

No.	Decimal	Fraction
1	0.25	
2	0.7	
3	0.03	
4	0.35	
5	0.545	

### Question 3:

Which of the decimals is bigger?

No.	Decimal 1	Decimal 2	Answer
1	0.25	0.5	
2	0.054	0.54	
3	0.12	0.0125	
4	0.7	0.007	
5	0.96	0.94	

### Question 4:

Add the two decimals to get the answers:

No.	Decimal 1	Decimal 2	Answer
1	0.33	0.1	
2	0.256	0.969	
3	0.7	0.25	
4	0.21	0.2	
5	0.115	0.003	



**Question 5:**

Subtract decimal 2 from decimal 1:

No.	Decimal 1	Decimal 2	Answer
1	0.33	0.033	
2	0.256	0.1	
3	0.7	0.365	
4	0.21	0.015	
5	0.115	0.105	

**Question 6:**

Multiply these decimals:

No.	Decimal 1	Decimal 2	Answer
1	2.3	0.09	
2	0.6	6.5	
3	3.2	0.12	
4	0.23	0.105	
5	0.005	3.00	

**Question 7:**

Divide these decimals:

No.	Decimal 1	Decimal 2	Answer
1	25	4.2	
2	5.65	3	
3	2.3	1.2	
4	0.7	1.45	
5	1.25	0.9	