



# The operations with decimal numbers

## Learning Skills

### Introduction:

There will be times when calculations involve decimal numbers. All students need to be familiar with how to add, subtract, multiply and divide decimal numbers.

### This sheet will teach you to:

- Understand decimal place
- Add and subtract decimals
- Divide into a decimal number
- Multiply decimals

## 1. What are decimals

Decimal numbers are numbers with a decimal point.

The place values for decimal numbers are as shown:

Hundreds	Tens	Units	•	Tenths	Hundredths	Thousandths	Ten thousandths
100	10	1		$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10000}$

The place values **after** the decimal point (the **decimal places (dp)**) represent **portions** of 1 whole.

Each place value after the decimal point represents a  $\frac{1}{10}$ th smaller portion of 1 whole.

Noughts can be added after the last decimal place in a decimal number without changing the value of that decimal

Units	•	Tenths	Hundredths	Thousandths
0	.	8		
0	.	8	0	
0	.	8	0	0

$$0.8 = 0.80 = 0.800$$

All whole numbers become decimal numbers by adding a decimal point after the last digit and a 0

So 3 becomes 3.0, 25 becomes 25.0

## 2. Adding and subtracting decimals

**Rule: Line the numbers up in their decimal places filling any blank places with noughts then add or subtract place by place.**

### Examples

a)  $25.68 + 5.279$

$$\begin{array}{r} 25.680 + \\ 5.279 \\ \hline 30.959 \end{array}$$

b)  $186.94 - 53.43$

$$\begin{array}{r} 186.94 - \\ 53.43 \\ \hline 133.51 \end{array}$$

## 3. Dividing into decimal numbers

**Rule: To divide decimals: divide in decimal places. You may need to add some noughts to make more decimal places for the division.**

### Examples:

a)  $4.6 \div 2$

$$= \frac{2.3}{2 \overline{)4.6}} = 2.3 \quad (\text{note that the decimal points line up})$$

b)  $0.83 \div 5$

$$= \frac{0.166}{5 \overline{)0.8330}} \leftarrow \text{add another 0}$$
$$= 0.166$$

## 4. Multiplying decimal numbers

**Rule: To multiply decimals: multiply the digits then count the number of decimal places in the question and give the answer the same number of decimal places.**

So multiplying decimals requires you to ignore decimal places until after the multiplying takes place

### Examples

a)  $22 \times 0.2$

$$\begin{aligned} &\longrightarrow 22 \times 02 = 22 \times 2 = 44 \\ &= 4.4 \end{aligned}$$

### Notes

**First: Ignoring the decimal point:**

$22 \times 02$ , which is just  $22 \times 2$

$22 \times 2 = 44$

**Then** counting the decimal places:

22 has 0 decimal places (dp)

0.2 has 1dp

0 dp + 1dp = 1dp

To give the answer 1 decimal place put a decimal point 1 place in from the end.

b)  $800 \times 0.06$

$$\begin{aligned} &\longrightarrow 800 \times 006 = 800 \times 6 = 4800 \\ &\text{Now give the answer two decimal places by putting a decimal point 2 places in from the end.} \\ &= 48.00 = 48 \end{aligned}$$

c)  $1.5 \times 1.8$

$$\begin{aligned} &\longrightarrow 15 \times 18 \end{aligned} \quad \begin{array}{r} 1.5 \times \\ 1.8 \\ \hline 120 \\ 150 \leftarrow \text{add a 0} \\ \hline 270 \end{array}$$

Now give the answer 2 dp =  $2.70 = 2.7$

Estimate:  $1 \times 1 = 1$ ,  $2 \times 2 = 4$  so answer must be between 1 and 4

d)  $0.6 \times 0.4$

$$\longrightarrow 06 \times 04 = 6 \times 4 = 24$$

Now give the answer 2dp = 0.24

Estimate:  $1 \times 1 = 1$ , as both numbers are less than 1 the answer must be less than 1

## 5. Some exercises to try

1)  $150.29 + 326.87$

2)  $456.3 - 257.6$

3)  $0.3 + 0.05$

4)  $0.34 - 0.06$

5) A patient's temperature rises from  $37.4^{\circ}\text{C}$  to  $40.2^{\circ}\text{C}$ . How much does the temperature rise?

6)  $16.8 \div 4$

7)  $96.32 \div 8$

8)  $0.84 \div 5$

9)  $4 \times 0.8$

10)  $3.2 \times 2.6$

11)  $0.8 \times 5.2$

12) A chemist buys 50 gram of tablets at  $\$8.56$  per gram. How much will the chemist pay?

## 6. Solutions

- |           |           |          |         |           |
|-----------|-----------|----------|---------|-----------|
| 1) 477.16 | 2) 198.7  | 3) 0.35  | 4) 0.28 | 5) 2.8° C |
| 6) 4.2    | 7) 12.04  | 8) 0.168 | 9) 3.2  | 10) 8.32  |
| 11) 4.16  | 12) \$428 |          |         |           |

## 7. For more information

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