

SATs Year 6 Parents'

# Arithmetic

Practice and Revision  
Activity Booklet



## Column addition and subtraction – including decimal numbers

Pupils are taught to use formal column methods for these types of questions.

The main mistakes usually seen in these types of questions are either:

- The correct operation not being used (if pupils have just completed 2 addition calculations and the next question is subtract, they will continue to add!)
- The decimal points not lined up correctly in decimal calculations.

Pupils have been taught to try to estimate answers beforehand to help them see if their calculation is correct.

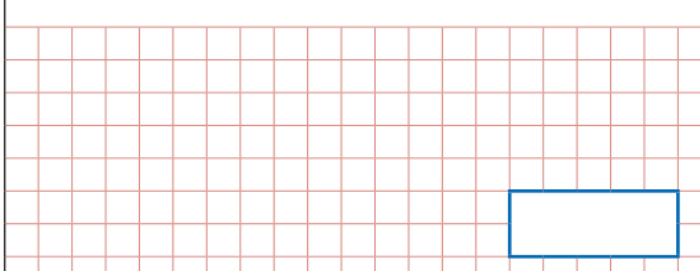
e.g.  $401.2 + 26.85 + 0.71$


$$\begin{array}{r} 401.20 \\ + 26.85 \\ + 0.71 \\ \hline 428.76 \end{array}$$

The children are taught to include bridged numbers inside their calculations so that they do not forget to add them. They are also taught to cross them out once they have been added so they can see they have included them.

When adding decimals with different numbers of decimal places, children should be taught and encouraged to make them the same through identification that 2 tenths is the same as 20 hundredths, therefore, 0.2 is the same value as 0.20.

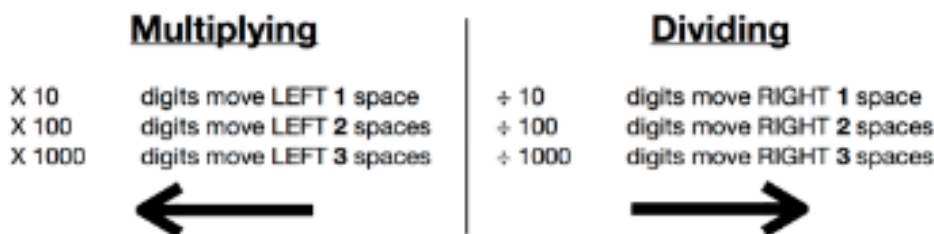
### Practice questions

<b>16</b>	$15.98 + 26.314 =$	<input type="text"/>	1 mark
			

<b>17</b>	$125.48 - 72.3 =$	<input type="text"/>	1 mark
			

# Multiplying and dividing by 10, 100 or 1000 – including decimal numbers

Pupils are taught the following rules for multiplying and dividing by values of ten:



## Multiplying Decimals by 10, 100 or 1000

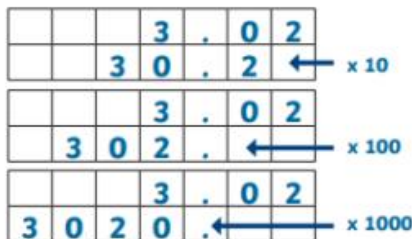
When multiplying a decimal number by 10, 100 or 1000, the value of each digit is multiplied.

$$3.02 \times 10 = 30.2$$

$$3.02 \times 100 = 302$$

$$3.02 \times 1000 = 3020$$

Each digit moves the necessary number of places to the left because multiplying by 10, 100 or 1000 increases the number.



**Remember:**

1. Keep the digits together.

Don't let any 0s jump in!

$$3.02 \times 100 = \overset{\text{X}}{300.2}$$

$$3.02 \times 100 = \overset{\text{✓}}{302}$$

2. Round to check:

$$3.02 \times 1000 = 3020$$

$$\text{use } 3 \times 1000 = 3000$$

## Dividing by 10, 100 or 1,000 Where Answers Are Decimals

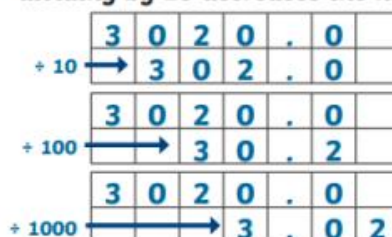
When dividing a number by 10, 100 or 1,000 the value of each digit is divided sometimes giving a decimal answer.

$$3020 \div 10 = 302$$

$$3020 \div 100 = 30.2$$

$$3020 \div 1000 = 3.02$$

Each digit moves the necessary number of place to the right because dividing by 10 decreases the number.



**Remember:**

1. Keep the digits together.

Don't let any 0s jump in!

$$34 \div 10 = \overset{\text{X}}{3}4$$

2. Round to check:

$$340 \div 100 = 3.4$$

$$\text{use } 300 \div 100 = 3$$

3. Use the inverse to check:

$$3.4 \times 1000 = 3400$$

## Practice questions

**13**

$$100 \times 412 =$$



1 mark

**20**

$$0.9 \div 10 =$$



1 mark

## Orders of operation – BODMAS

This is the order to solve a sum that has more than one operation included. You need to do the operations in order of BODMAS.

**B** Brackets ( )  
 $10 \times (2 + 6) = 10 \times 8 = 80$

**O** Order  $n^2$  - Also known as Indices.  
 $10 + 3^2 = 10 + 9 = 19$

**D** Division  $\div$   
 $10 - 8 \div 2 = 10 - 4 = 6$

**M** Multiplication  $\times$   
 $6 + 3 \times 2 = 6 + 6 = 12$

**A** Addition  $+$   
 $6 + 3 \times 2 = 6 + 6 = 12$

**S** Subtraction  $-$   
 $10 - 8 \div 2 = 10 - 4 = 6$

Do first

Order of priority

Do last

Note - If you have a sum with only a multiplication and division (or only addition and subtraction), start from left to right as you would normally.

### Practice questions

14	$50 + (36 \div 6) =$	<input type="text"/>	<input type="text"/>	1 mark
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32	$9^2 - 36 \div 9 =$	<input type="text"/>	<input type="text"/>	1 mark
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# Short multiplication – including multiplying a single digit whole number by a decimal

e.g.  $368 \times 6$

$$\begin{array}{r} 368 \\ \times 6 \\ \hline 2208 \end{array}$$

e.g.  $4.92 \times 3$

$$\begin{array}{r} 4.92 \\ \times 3 \\ \hline 14.76 \end{array}$$

Like column addition and subtraction, the children are taught to include bridged numbers inside their calculations so that they do not forget to add them. They are also taught to cross them out once they have been added so they can see they have included them.

## Practice questions

<b>10</b>	$879 \times 3 =$		
		<input type="text"/>	<input type="checkbox"/> 1 mark

<b>27</b>	$3.9 \times 3 =$		
		<input type="text"/>	<input type="checkbox"/> 1 mark

# Long multiplication – including multiplying whole numbers by a decimal or decimal multiplied by a decimal

e.g.  $693 \times 24$

$$\begin{array}{r}
 \begin{array}{r}
 693 \\
 \times 24 \\
 \hline
 2772 \\
 + 13860 \\
 \hline
 16632
 \end{array} \\
 \text{(693} \times 4) \\
 \text{(693} \times 20)
 \end{array}$$

On the second row, pupils have been taught to add a zero in the ones column as they are now multiplying by a value of ten. They can then treat the rest of this row like a short multiplication ( $693 \times 2$ ).

Once the pupils have calculated both rows, they then add the two rows together for the final answer.

e.g.  $4.7 \times 40$

Treat the decimal number as if it is a whole number and do the long multiplication method.

$$\begin{array}{r}
 \begin{array}{r}
 47 \\
 \times 40 \\
 \hline
 00 \\
 + 1880 \\
 \hline
 1880
 \end{array} \\
 \text{(47} \times 0) \\
 \text{(47} \times 40)
 \end{array}$$

Now add the decimal point where needed. Count the number of digits after the decimal point. This is the number of digits you need to count from the right hand side of your answer and then add the decimal point to the answer.

$$\begin{array}{r}
 \begin{array}{r}
 4.7 \\
 \times 40 \\
 \hline
 00 \\
 + 1880 \\
 \hline
 188.0
 \end{array}
 \end{array}$$

# Practice questions

<b>29</b>	$\begin{array}{r} 5413 \\ \times \quad 86 \\ \hline \end{array}$	<input data-bbox="1334 734 1414 815" type="checkbox"/> 2 marks
Show your method	<div data-bbox="979 734 1248 846" style="border: 1px solid blue; width: 168px; height: 50px; margin: 0 auto;"></div>	

<b>27</b>	$3.9 \times 30 =$	<input data-bbox="1340 1438 1420 1518" type="checkbox"/> 1 mark
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## Long division

On the arithmetic test, these are worth 2 marks – 1 for appropriate working out and 1 for the correct answer. On the arithmetic test, the answers are usually a whole number with no remainders.

Pupils have two methods to help us solve these sums – chunking (if dividing by a prime number) or factor short divisions (if not prime and can be split easily into smaller factor pair values).

### Method 1 - chunking

Pupils have been taught how to use chunking to get to the correct answer if the number you are dividing by is a prime number (can only be divided by 1 and itself) or if it is a large non-prime (composite) value with large factor pairs.

First, pupils write jotting calculations to help them identify suitable 'chunks' to subtract from the starting value.

e.g.  $6356 \div 28$

$$\begin{array}{r} 227 \\ 28 \overline{)6356} \\ - \underline{5600} \\ 756 \\ - \underline{560} \\ 196 \\ - \underline{140} \\ 56 \\ - \underline{56} \\ 0 \end{array}$$

200x

20x

5x

2x

### Jottings

$$1 \times 28 = 28$$

$$2 \times 28 = 56$$

$$5 \times 28 = 140$$

$$10 \times 28 = 280$$

$$20 \times 28 = 560$$

$$100 \times 28 = 2800$$

$$200 \times 28 = 5600$$

Next, pupils keep subtracting chunks from the starting value until they get to zero or a value less than the number they are dividing by. They then add the amount of 'chunks' ( $200 + 20 + 5 + 2$ ) for the final answer. If there is any number left over, this is the remainder.

## Method 2 – factor pair short division

Pupils have been taught how to use factor pairs to help solve long divisions quicker if the number is not prime and the factors are not too large (two single digits are the best to work with). By doing this method, pupils can avoid having to create a set of jottings and can just do two short divisions instead.

e.g.  $6356 \div 28$

**Step 1** – find the factor pairs of the number you are dividing by. Factor pairs are two whole numbers that multiply to make the number.

$$\text{Factor pairs of } 28 = 1 \times 28$$

$$2 \times 14$$

$$4 \times 7$$

**Step 2** – use the easiest factor pair to work with (4 and 7) to divide into the starting number


$6356 \div 28$  then becomes  $6356 \div 7 = \text{answer}$

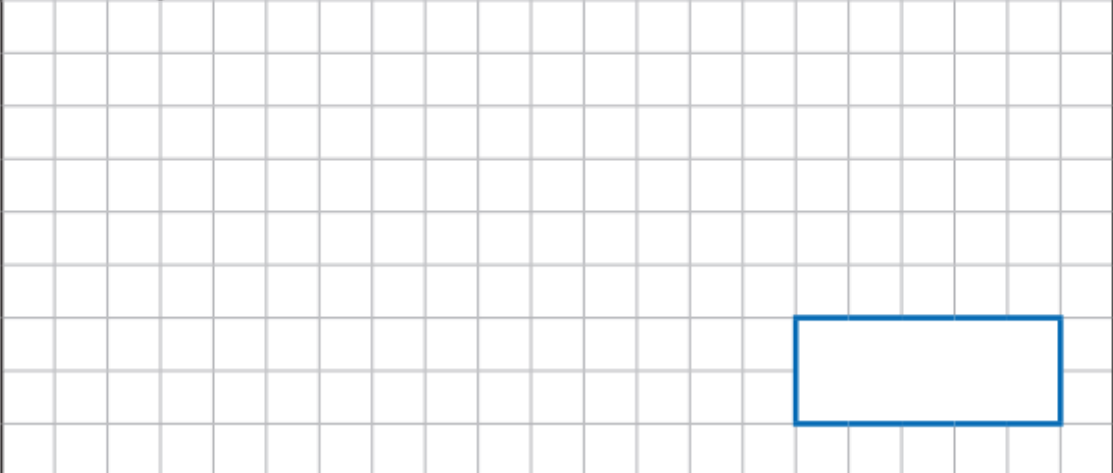
$\text{answer} \div 4 = \text{final answer}$

$$\begin{array}{r} 0908 \\ 7 \overline{)6356} \\ \underline{6} \phantom{3} \phantom{5} \phantom{6} \\ \phantom{6} 6 \phantom{3} \phantom{5} \phantom{6} \\ \underline{\phantom{6} 6} \phantom{3} \phantom{5} \phantom{6} \\ \phantom{6} \phantom{6} \phantom{3} \phantom{5} \phantom{6} \\ \underline{\phantom{6} \phantom{6} \phantom{3} 5} \phantom{6} \\ \phantom{6} \phantom{6} \phantom{3} 5 \phantom{6} \\ \underline{\phantom{6} \phantom{6} \phantom{3} 5} 6 \\ \phantom{6} \phantom{6} \phantom{3} 5 6 \end{array}$$

$$\begin{array}{r} 227 \\ 4 \overline{)908} \\ \underline{8} \phantom{0} \phantom{8} \\ \phantom{8} 1 \phantom{0} \phantom{8} \\ \underline{\phantom{8} 1} \phantom{0} \phantom{8} \\ \phantom{8} \phantom{1} \phantom{0} \phantom{8} \\ \underline{\phantom{8} \phantom{1} \phantom{0} 8} \\ \phantom{8} \phantom{1} \phantom{0} 8 \end{array}$$

# Practice questions

<b>36</b>	9 7   8 8 2 7	
Show your method		<input data-bbox="1428 683 1508 761" type="checkbox"/> 2 marks

<b>17</b>	2 1   6 7 2	
Show your method		<input data-bbox="1428 1377 1508 1456" type="checkbox"/> 2 marks

## Percentage of an amount

Pupils have been taught to use jottings similar to long division to help them solve these types of questions.

e.g. 37% of 800 (note – this could be also written as  $37\% \times 800$ )

### Jottings to help

$$100\% = 800$$

$$10\% = 80$$

$$5\% = 40$$

$$1\% = 8$$

$$\text{If } 10\% = 80, 30\% = 80 \times 3 = 240$$

$$5\% + 1\% + 1\% = 7\%$$

$$40 + 8 + 8 = 56$$

$$\text{So } 37\% = 240 + 56 = 296$$

## Practice questions

<b>31</b>	7% of 500 =	
		<input type="text"/>
		<input type="checkbox"/> 1 mark

<b>29</b>	15% $\times$ 440 =	
		<input type="text"/>
		<input type="checkbox"/> 1 mark

## Fraction of an amount

These types of questions can be written two ways:

$$\frac{3}{5} \text{ of } 340 \quad \text{or} \quad \frac{3}{5} \times 340$$

To solve these, you divide the number by the denominator (the bottom part of the fraction) and then you multiply this answer by the numerator (the top part of the fraction).

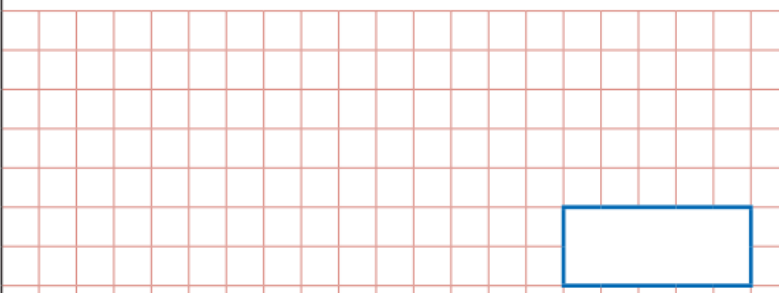
$$340 \div 5 = 68 \quad 68 \times 3 = 204$$


The rhyme we use in class to help us remember this is:

**D**ivide by the **D**enominator

**T**imes by the **T**op

### Practice questions

<b>19</b>	$\frac{3}{4}$ of 1,000 =
	
<input type="text"/>	
1 mark	

<b>34</b>	$\frac{2}{5} \times 140 =$
	
<input type="text"/>	
1 mark	

## Adding and subtracting fractions – proper fractions with the same denominator

A proper fraction is when the numerator (top number) is less than the denominator (bottom number). If the denominators are the same, we can just add the numerators together.

$$\frac{3}{5} + \frac{4}{5} = \frac{7}{5} \quad \text{or} \quad 1\frac{2}{5}$$

On the arithmetic test, you can leave the answer as an improper fraction (when the numerator is larger than the denominator) or convert to a mixed number fraction.

### Practice questions

19

$$\frac{1}{9} + \frac{4}{9} =$$

1 mark

12

$$\frac{62}{100} - \frac{38}{100} =$$

1 mark

## Adding and subtracting fractions – proper fractions with different denominators

$$\frac{3}{5} + \frac{9}{10}$$



$$\frac{3 \times 2 = 6}{5 \times 2 = 10}$$

We need to get the denominators the same. By multiplying the  $\frac{3}{5}$  fraction by  $\underline{2}$ , it will become tenths like the other fraction.

$$\frac{6}{10} + \frac{9}{10} = \frac{15}{10} \quad \text{or} \quad 1 \frac{5}{10}$$

$$\frac{3}{5} + \frac{4}{6}$$



$$\frac{3 \times 6 = 18}{5 \times 6 = 30}$$

$$\frac{4}{6}$$



$$\frac{4 \times 5 = 20}{6 \times 5 = 30}$$

Again, we need to get the denominators the same. If it is not obvious what to multiply the denominators by, multiply each fraction by the opposite fraction's denominator.

$$\frac{18}{30} + \frac{20}{30} = \frac{38}{30} \quad \text{or} \quad 1 \frac{8}{30}$$

### Practice questions

23

$$\frac{3}{4} - \frac{3}{8} =$$

1 mark

24

$$\frac{1}{2} + \frac{1}{5} =$$

1 mark





## Multiplying a fraction by another fraction

$$\frac{3}{5} \times \frac{4}{7}$$

Just multiply the numerators (top numbers) together.

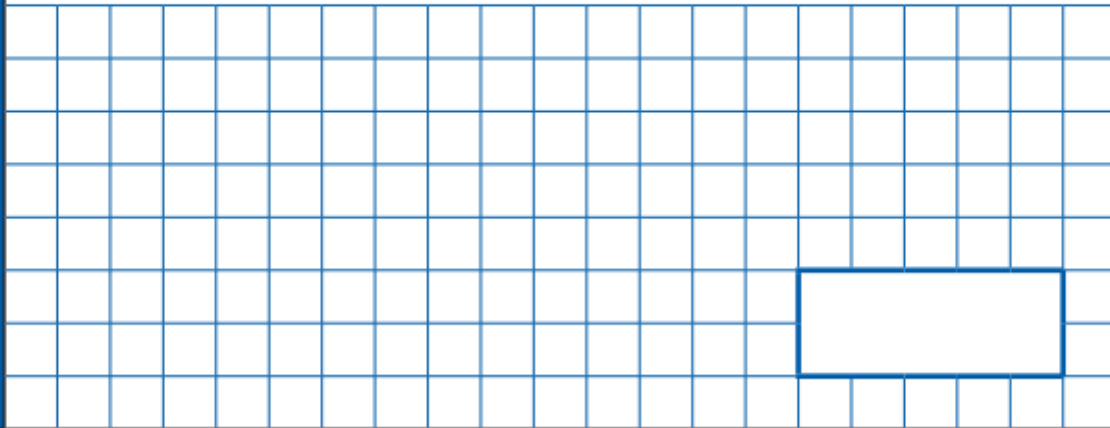
Next, multiply the denominators (bottom numbers) together.

$$\frac{3 \times 4}{5 \times 7} = \frac{12}{35}$$

### Practice question

26

$$\frac{1}{4} \times \frac{1}{8} =$$



1 mark

## Dividing a fraction by another fraction or dividing a fraction by a whole number

Pupils have been taught to use the K.C.F method for solving these types of questions.

$$\begin{array}{ccc}
 \frac{2}{5} & \div & \frac{1}{7} \\
 \downarrow & & \downarrow \\
 \boxed{\text{K}} & & \boxed{\text{C}} & & \boxed{\text{F}} \\
 \downarrow & & \downarrow & & \downarrow \\
 \frac{2}{5} & \times & \frac{7}{1}
 \end{array}$$

**K = Keep**

**C = Change**

**F = Flip**

1. **Keep** the first fraction the same.
2. **Change** the division for a multiplication.
3. **Flip** the second fraction.

Now just solve the question the same as multiplying fractions by fractions (see last section).

$$\frac{2 \times 7}{5 \times 1} = \frac{14}{5} \quad \text{or} \quad 1 \frac{4}{5}$$

If it is a **fraction divided by a whole number**, we still use the K.C.F. method, but first we need to turn the whole number into a fraction by putting it over 1.


$$\begin{array}{ccc}
 \frac{3}{4} \div 3 & \text{becomes} & \frac{3}{4} \div \frac{3}{1} \\
 & & \downarrow \quad \downarrow \quad \downarrow \\
 & & \boxed{\text{K}} \quad \boxed{\text{C}} \quad \boxed{\text{F}} \\
 & & \downarrow \quad \downarrow \quad \downarrow \\
 \frac{3}{4} \times \frac{1}{3} & = & \frac{3}{12} \quad \text{or} \quad \frac{1}{4}
 \end{array}$$

Now use K.C.F. method from this point to solve the question.

## Practice questions

33

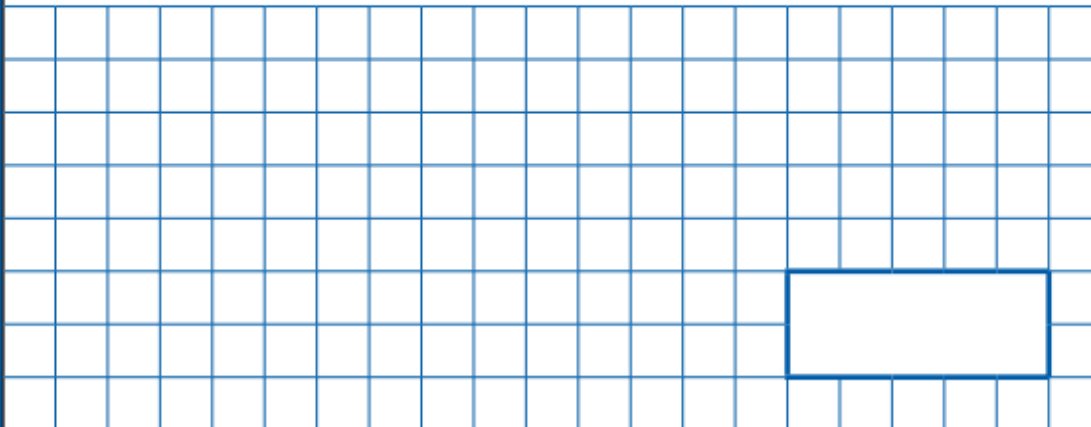
$$\frac{3}{5} \div 3 =$$



1 mark

36

$$\frac{3}{4} \div 2 =$$



1 mark