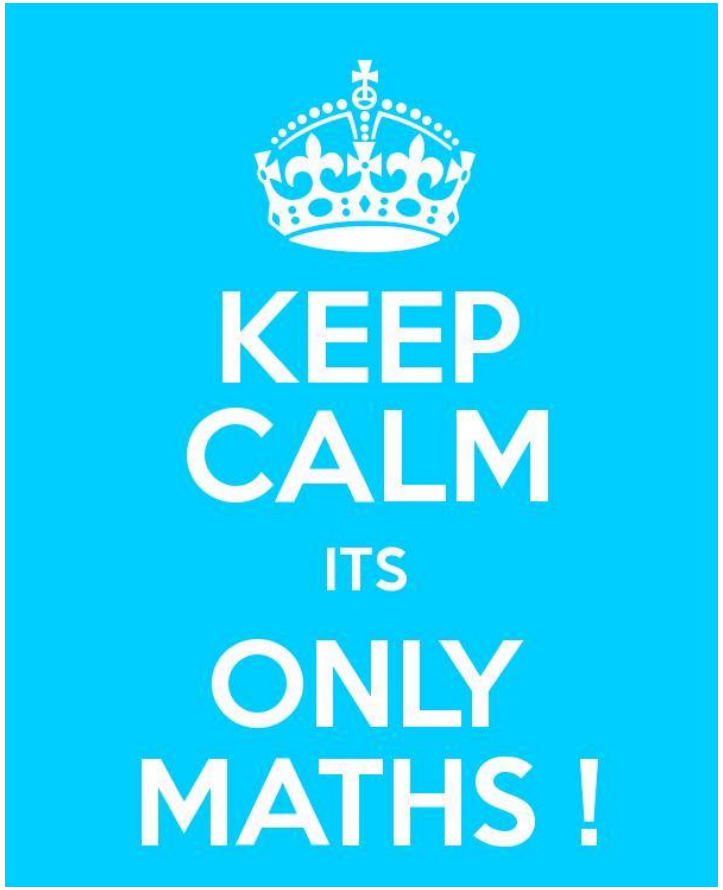
Welcome to the Year 6 Arithmetic Methods Session



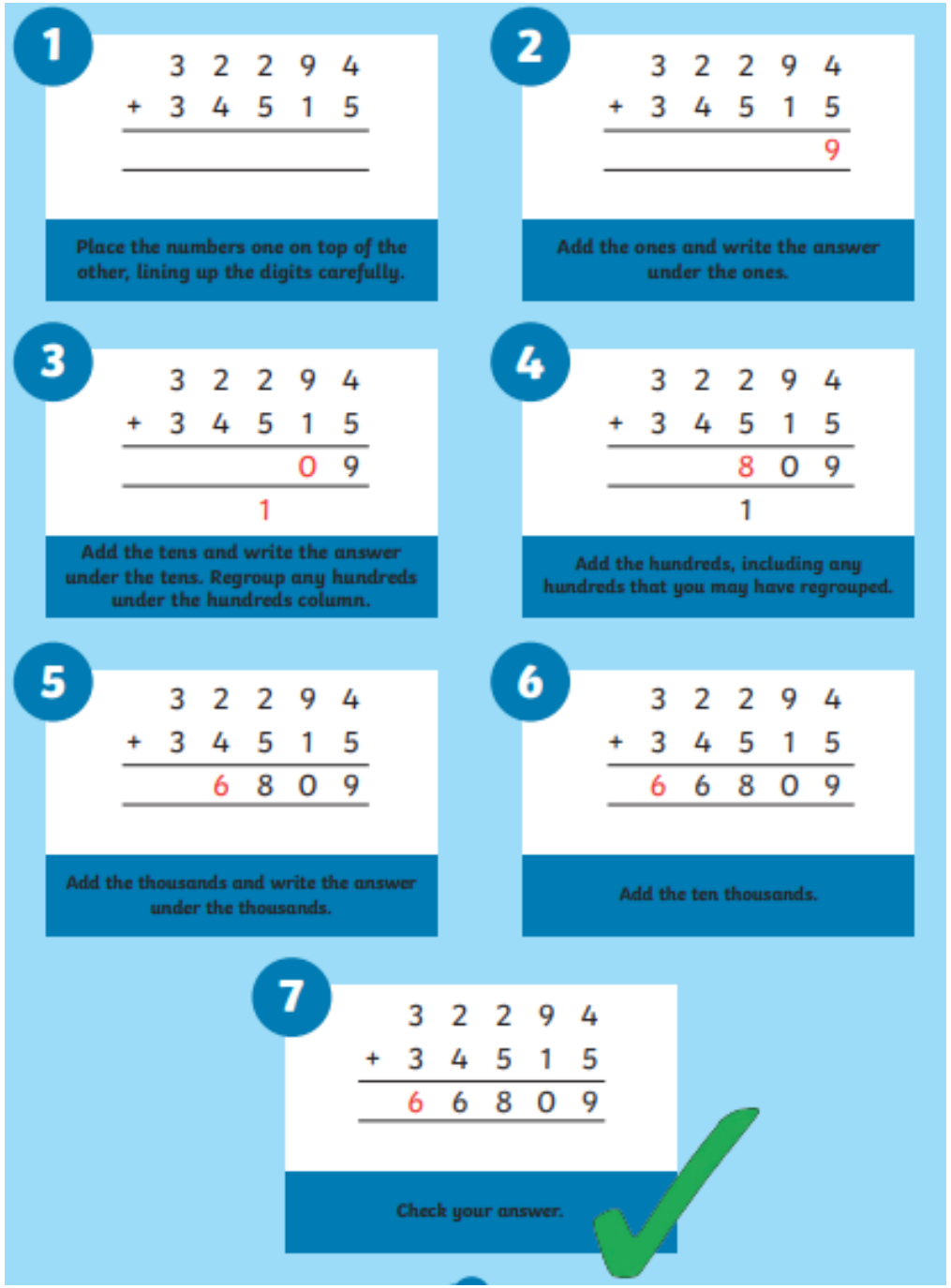
Addition of whole numbers - Column Method

Q1

39 + 673 =

```
  673
+  39
 ---
  712
  1
```

712



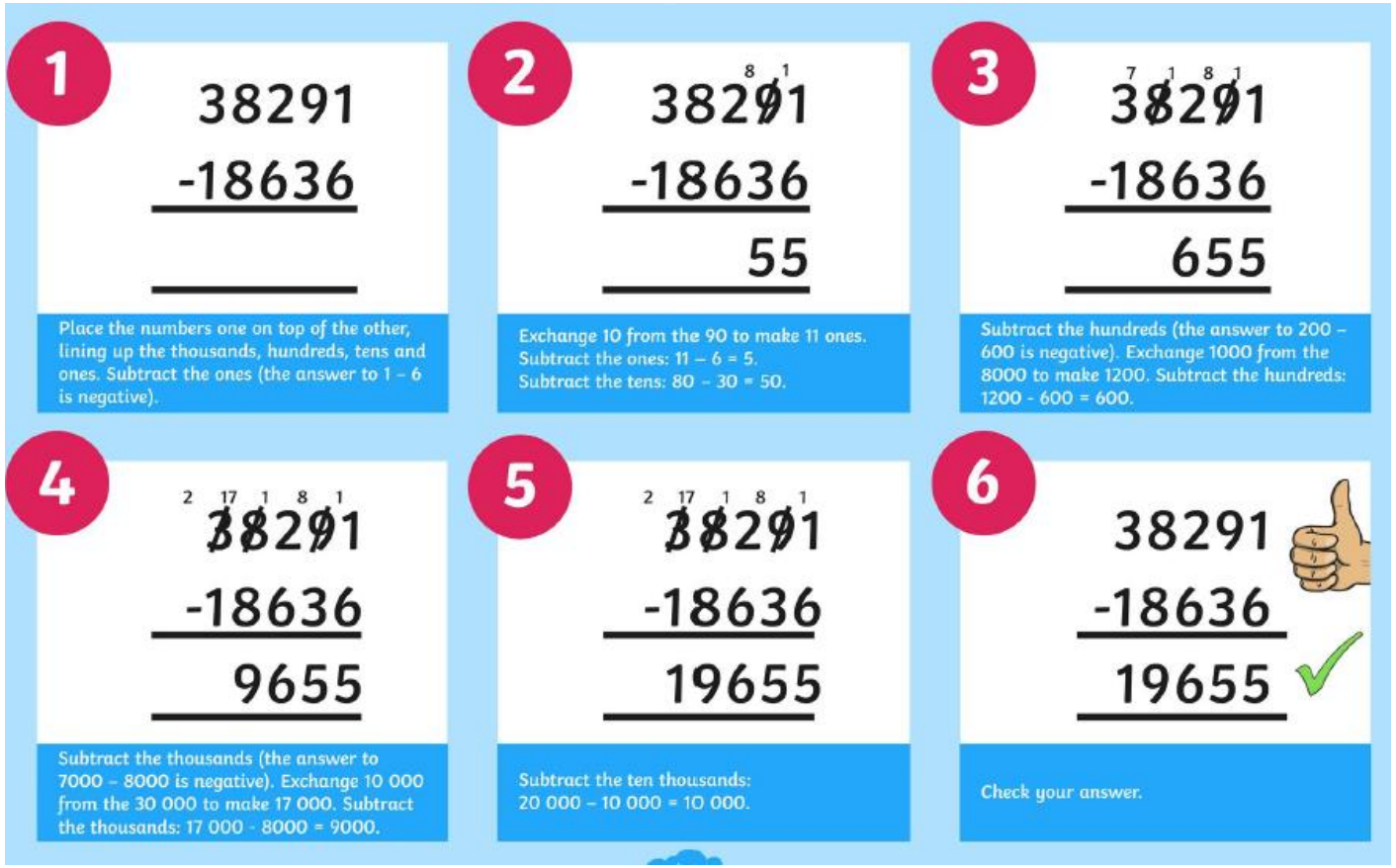
Subtraction of whole numbers - Column Method

Q2

345 − 60 =

$$\begin{array}{r} {}^{2}\not{3}\,{}^{1}4\,5 \\ -\quad 6\,0 \\ \hline 2\,8\,5 \end{array}$$

285



Addition and subtraction of decimal numbers - Column Method

Q2&3

$9 - 3.45 =$

$$\begin{array}{r} {}^{8}\cancel{9}.{}^{1}\cancel{8}{}^{9}0 \\ -\ 3.45 \\ \hline 5.55 \end{array}$$

5.55

$2.7 \oplus 3.014 =$

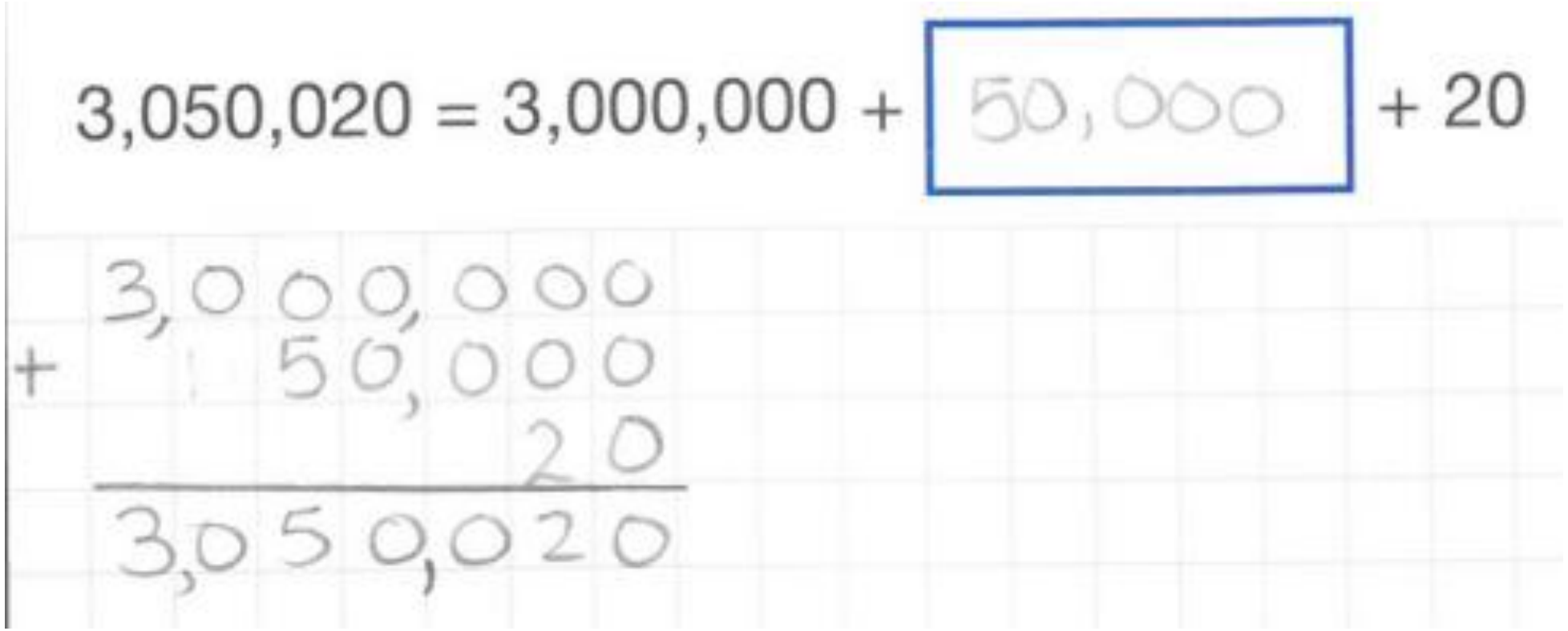
Often - and + problems will be close together; circle the operatio

$$\begin{array}{r} 3.014 \\ +\ 2.700 \\ \hline 5.714 \end{array}$$

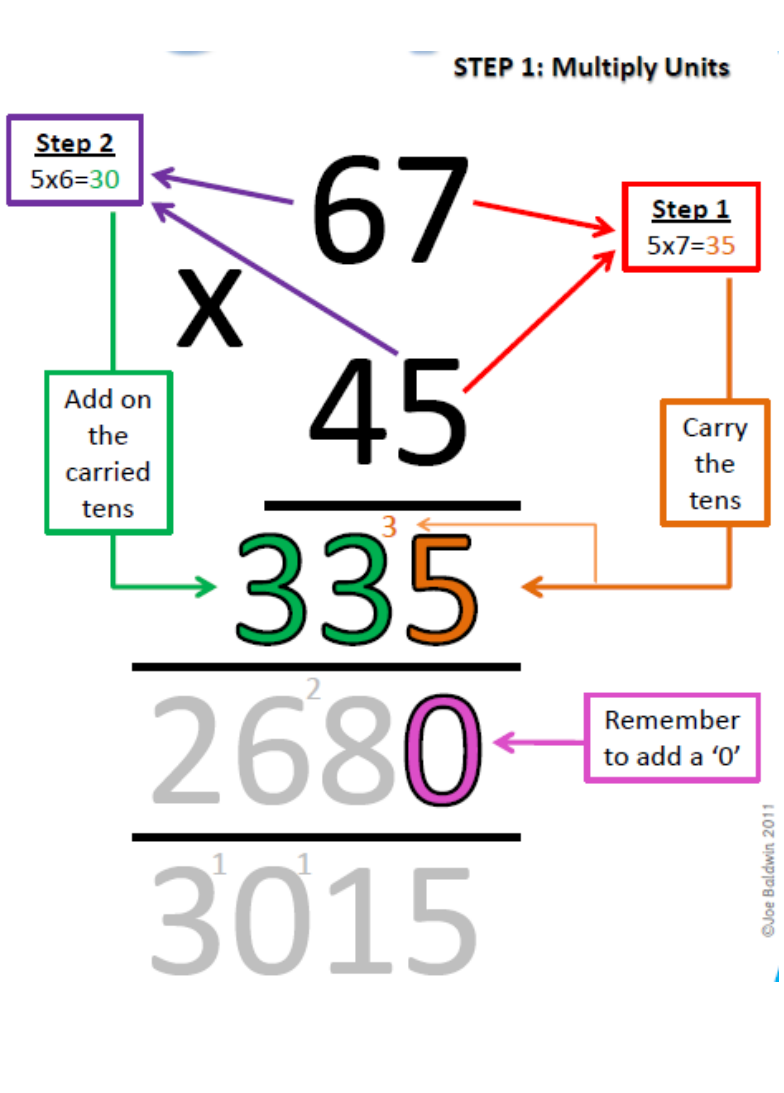
5.714

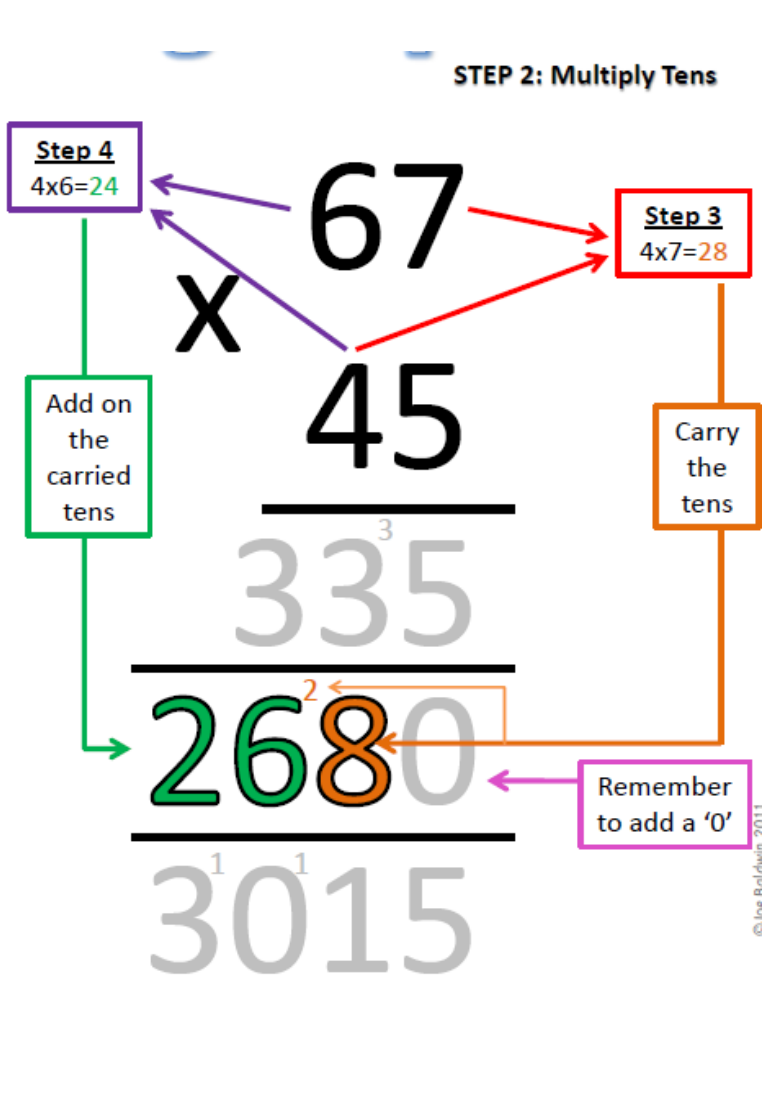
Understanding the place value within addition (partitioning)

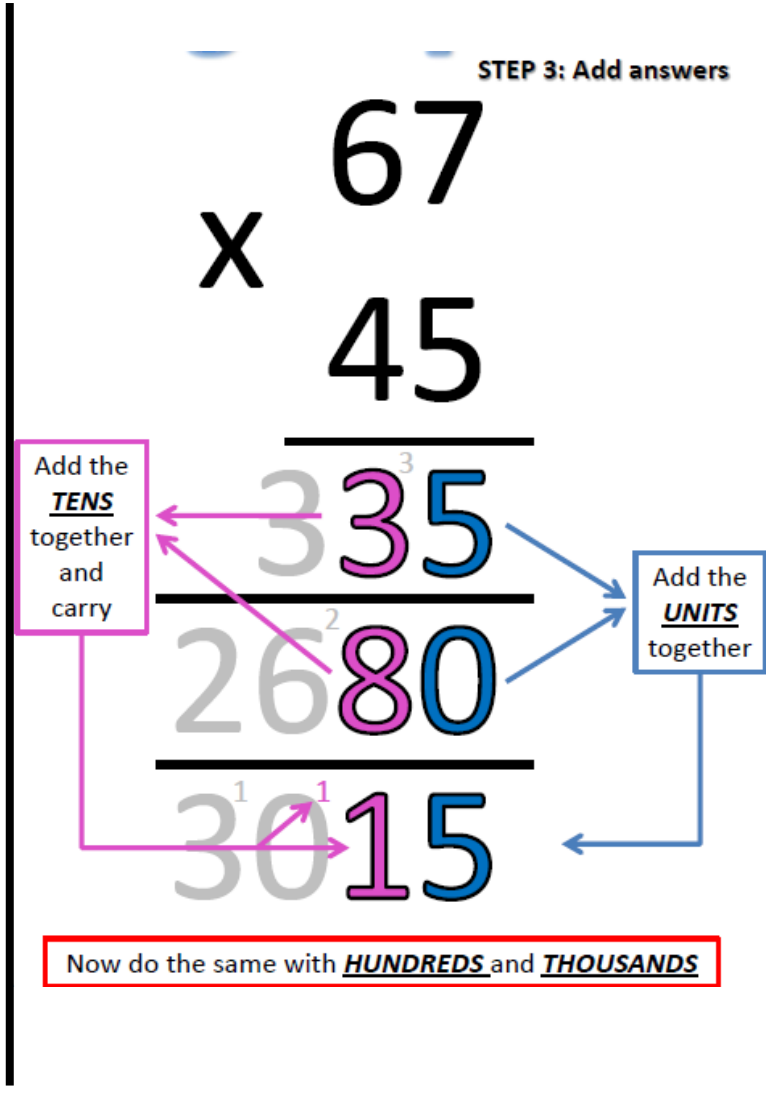
Q5



Multiplication of two numbers - long multiplication method







Multiplication of two numbers - long multiplication method

Q6

$8 \times 33 =$

$$\begin{array}{r} 33 \\ \times\ 8 \\ \hline 264 \\ {\scriptstyle 2} \end{array}$$

264

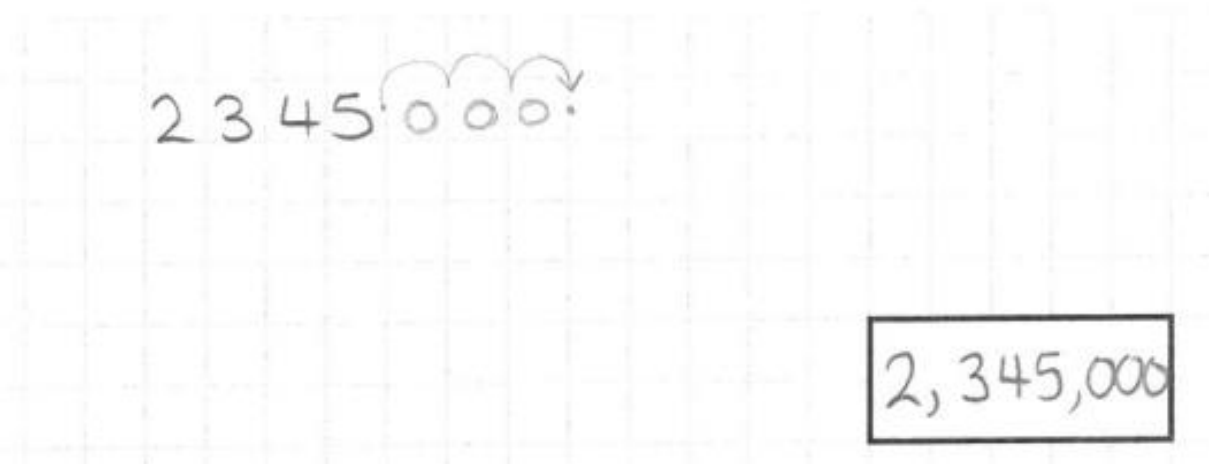
$$\begin{array}{r} 4781 \\ \times\ 23 \\ \hline 14343 \\ +\ 95620 \\ \hline 109,963 \end{array}$$

109,963

Multiplying and dividing by 10, 100 and 1000 -movement of digits

Q7 & 8

$2{,}345 \times 1{,}000 =$



2,345,000

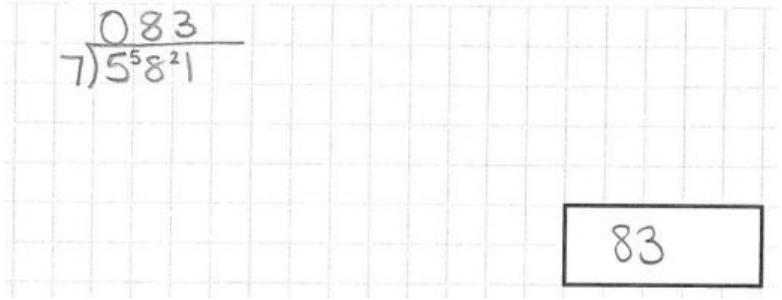
$0.04 \div 10 =$

0.004

Division of a number using short division

Q9

581 ÷ 7 =



5284 ÷ 12

1

$$12\overline{)\,5\;{}^{5}2\;8\;4}$$

First we divide 5 (thousands) by 12. This gives a result of 0 with a remainder of 5. The remainder 5 (thousands) is exchanged for 50 hundreds and placed into the hundreds column. This is shown by a small 5 in front of the existing 2 hundreds to make 52 hundreds.

2

$$\begin{array}{r} \phantom{12\overline{)}}\;\;4 \\ 12\overline{)\,5\;{}^{5}2\;{}^{4}8\;4} \end{array}$$

Next, we divide 52 (hundreds) by 12. This gives a result of 4 (hundreds) remainder 4. The remainder 4 (hundreds) is exchanged for 40 tens and placed into the tens column. This is shown by a small 4 in front of the existing 8 tens to make 48 tens. The 4 is written in the hundreds position of the answer above the line.

3

$$\begin{array}{r} \phantom{12\overline{)}}\;\;4\;\;4 \\ 12\overline{)\,5\;{}^{5}2\;{}^{4}8\;4} \end{array}$$

Next we divide 48 (tens) by 12. This gives a result of 4. The 4 is written in the tens position of the answer above the line.

4

$$\begin{array}{r} \phantom{12\overline{)}}\;\;4\;\;4\;\;0 \\ 12\overline{)\,5\;2\;8\;4} \end{array}$$

Next, we divide 4 (ones) by 12. This cannot be done, so there are four remaining. A zero is placed in the ones answer section as well as remainder 4.

5284 ÷ 12 = 440 r4

Division of a number giving a decimal answer (short division)

Q10

5286 ÷ 12

1

$$12 \overline{)\ 5\ {}^{5}2\ 8\ 6}$$

First, divide 5 (thousands) by 12. This gives a result of 0 with a remainder of 5. The remainder 5 (thousands) is exchanged for 50 hundreds and placed into the hundreds column. This is shown by a small 5 in front of the existing 2 hundreds to make 52 hundreds.

2

$$\begin{array}{r} 4 \\ 12 \overline{)\ 5\ {}^{5}2\ {}^{4}8\ 6} \end{array}$$

Next, divide 52 (hundreds) by 12. This gives a result of 4 (hundreds) remainder 4. The remainder 4 (hundreds) is exchanged for 40 tens and placed into the tens column. This is shown by a small 4 in front of the existing 8 tens to make 48 tens. The 4 is written in the hundreds position of the answer above the line.

3

$$\begin{array}{r} 4\ \ 4 \\ 12 \overline{)\ 5\ {}^{5}2\ {}^{4}8\ 6} \end{array}$$

Next, divide 48 (tens) by 12. This gives a result of 4. The 4 is written in the tens position of the answer above the line.

4

$$\begin{array}{r} 4\ \ 4\ \ 0 \\ 12 \overline{)\ 5\ {}^{5}2\ {}^{4}8\ 6.\ {}^{6}0} \end{array}$$

Next, divide 6 (ones) by 12. This cannot be done. This gives a result of 0 with a remainder of 6. Extend the number being divided to show the tenths place. The remainder 6 (ones) can now be exchanged for 60 tenths and placed into the tenths column. This is shown by a small 6 in front of 0 tenths to make 60 tenths. Remember to place the decimal point in your answer section.

5

$$\begin{array}{r} 4\ \ 4\ \ 0.\ \ 5 \\ 12 \overline{)\ 5\ {}^{5}2\ {}^{4}8\ 6.\ {}^{6}0} \end{array}$$

Next, divide 60 (tenths) by 12. This gives a result of 5. The 5 is written in the tenths position of the answer above the line.

6

$$5286 \div 12 = 440.5$$

Division of a number by a 2-digit number - long division

591 ÷ 12

Work out the answer to two decimal places.

1

answer section

```
      4
  ┌──────
12│ 5 9 1
    4 8
  ──────
    1 1 1
```

First, work out how many 12s there are in 59. The answer to this question is 4, which is written above the 9. We then write the product of 4 and 12 (48) under 59 and subtract giving 11. The 1 is then brought down and written next to 11 to make 111.

2

answer section

```
      4 9
  ┌──────
12│ 5 9 1
    4 8 ↓
  ──────
    1 1 1
    1 0 8
  ──────
        3
```

Next, work out how many 12s there are in 111. The answer to this question is 9, which is written above the 1. Then, write the product of 9 and 12 (108) under 111 and subtract it, giving 3.

3

answer section

```
      4 9 .
  ┌──────
12│ 5 9 1 . 0 0
    4 8 ↓
  ──────
    1 1 1
    1 0 8 ↓ ↓
  ──────
        3 . 0
```

Extend 591 into decimals to continue the process of long division.
The 0 in the tenths place is then brought down and written next to 3 to make 30.

4

answer section

```
      4 9 . 2
  ┌──────
12│ 5 9 1 . 0 0
    4 8 ↓
  ──────
    1 1 1
    1 0 8 ↓ ↓
  ──────
        3 . 0
        2 . 4 ↓
      ──────
          6 0
```

Next, work out how many 12s there are in 30. The answer to this question is 2, which is written above the 0 in the tenths place. Then, write the product of 2 and 12 (24) under 30 and subtract it, giving 6. The 0 is then brought down and written next to 6 to make 60.

5

answer section

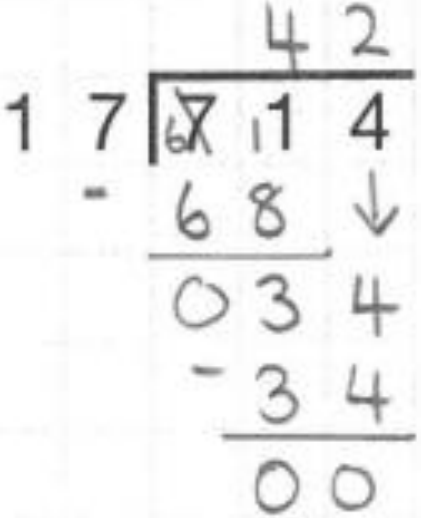
```
      4 9 . 2 5
  ┌──────
12│ 5 9 1 . 0 0
    4 8 ↓
  ──────
    1 1 1
    1 0 8 ↓ ↓
  ──────
        3 . 0
        2 . 4 ↓
      ──────
          . 6 0
          . 6 0
        ──────
            0
```

Next, find out how many 12s there are in 60. The answer to this question is 5, which is written above the 0 in the hundredths place. Then, write the product of 5 and 12 (60) under 60 and subtract it, giving zero.

591 ÷ 12 = 49.25

Division of a number by a 2-digit number - long division

Q11



Do this first! → 17

÷

×

−

+

	34
	51
	68
	85
1	02
1	19

42

Q12

Ordering Mathematical Operations

B	O	D	M	A	S
Brackets	Orders	Division	Multiplication	Addition	Subtraction
(...)	$\sqrt{x}$ x^2	÷	×	+	-

$9^2 - 36 \div 9 =$

9^2 ÷ −

B O D M A S

9^2

9×9

$81 - (36 \div 9)$

$81 - 4 = 77$

(If + and −, do in given order
If × and ÷, do in given order)

77

$50 + (36 \div 6) =$

$50 + 6 = 56$

56

$6^2 + 10 =$

6×6

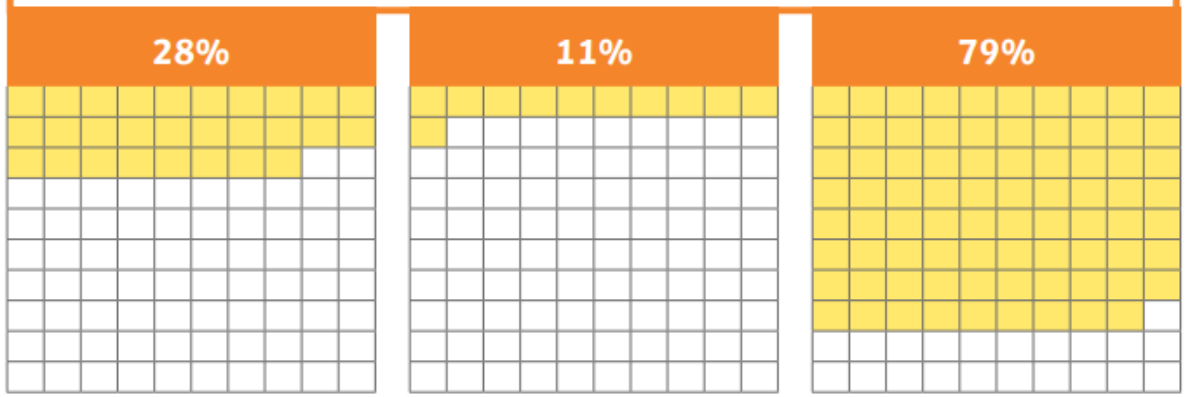
$36 + 10 = 46$

46

Find a percentage of an amount

Q13

The word percent comes from the Latin words **per** and **cent** meaning '**out of every 100**'. The symbol for percent is **%**.



7% of 500 =

1% = 5 (500 ÷ 100)

×7 ×7

7% = 35 (5 × 7)

35

15% × 1,000 =

X means 'of'

15% of 1000

10% = 100 (1000 ÷ 10)

+ ½ +

5% = 50 (100 ÷ 2)

15% = 150

150

Find a fraction of a quantity

Q14

$\frac{5}{8}$ of 248

$$8\overline{)248} = 31 = \frac{1}{8}$$

You need $\frac{5}{8}$, so 5 times more.

$$31 \times 5 = 155 = \frac{5}{8}$$

155

Add and subtract fractions with the same denominator

Q15 & 16

$$\frac{9}{11} - \frac{4}{11} =$$

$$\frac{9}{11} - \frac{4}{11} = \frac{5}{11}$$

$$\boxed{\frac{5}{11}}$$

Add and subtract fractions with different denominators

Q17 & 18

$\frac{2}{6} - \frac{1}{8} =$

Both go in to 24

$\frac{2}{6}^{\times 4} - \frac{1}{8}^{\times 3}$

$\frac{8}{24} - \frac{3}{24} = \frac{5}{24}$

$\frac{5}{24}$

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

$\frac{1}{2}^{\times 5} + \frac{1}{5}^{\times 2}$

$\frac{5}{10} + \frac{2}{10} = \frac{7}{10}$

2 5
4 10
6
8
10

$\frac{7}{10}$

$\frac{1}{4} + \frac{1}{5} + \frac{1}{10} =$

All go in to 20

$\frac{1}{4}^{\times 5} + \frac{1}{5}^{\times 4} + \frac{1}{10}^{\times 2}$

$\frac{5}{20} + \frac{4}{20} + \frac{2}{20} = \frac{11}{20}$

$\frac{11}{20}$

Add and subtract mixed number fractions

Q19 & 20

$1\frac{3}{4} + 1\frac{3}{4} =$

1) convert to improper
2) convert denominators if necessary
3) add
4) convert back to mixed number
5) simplify if asked (or if you can)

$\frac{7}{4} + \frac{7}{4} = \frac{14}{4} = 3\frac{2}{4} = 3\frac{1}{2}$

$3\frac{1}{2}$

$4\frac{2}{3} - 1\frac{6}{7} =$

1) change to improper
2) convert to same denominator
3) subtract numerator

$\frac{14}{3}^{\times 7} - \frac{13}{7}^{\times 3}$

$14 \times 7 = 98$ $\quad 13 \times 3 = 39$

$\frac{98}{21} - \frac{39}{21} = \frac{59}{21}$

$\frac{59}{21}$

Multiply fractions

Multiply the numerator and the denominator

Q21

$$\frac{4}{6} \times \frac{3}{5} =$$

$$\frac{4}{6} \times \frac{3}{5} = \frac{12}{30} = \frac{2}{5}$$

÷6

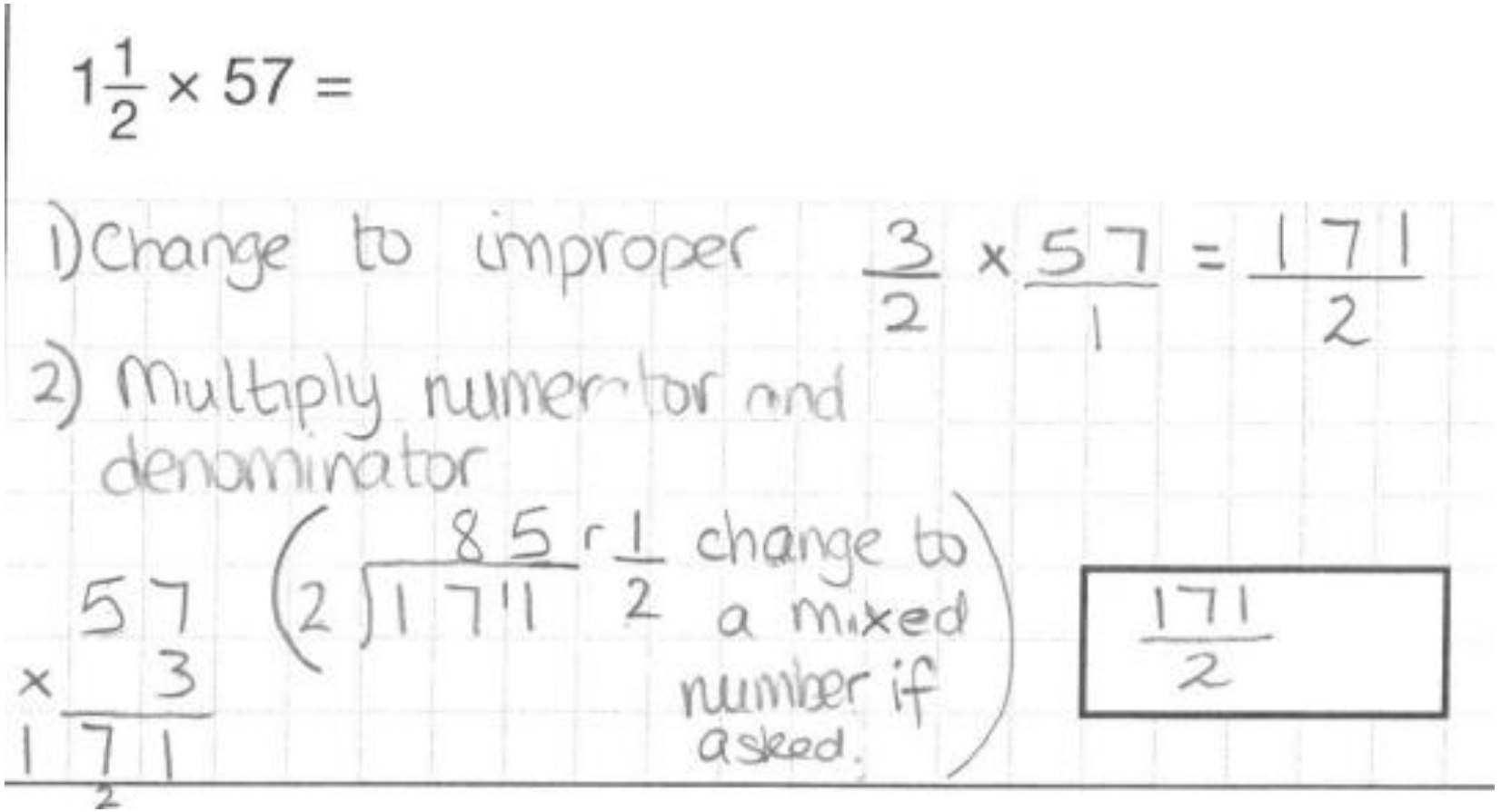
÷6

Answer doesn't need to be simplified unless stated.

Only one answer → $\frac{12}{30}$

Multiplication of a mixed number by a whole number

Q22



** Some children may find it easier (dependent on the question) to find 1 lot of the number (e.g. 1 x 57 = 57) and then ½ of the number (e.g. ½ x 57 = 28.5). Finally, add the two totals together (e.g. 57 + 28.5 = 85.5)

Multiply a fraction by an integer

Q23

$\frac{3}{4} \times 40 =$

$\frac{3}{4} \times \frac{40}{1} = \frac{120}{4} = 30$

$$4\overline{)120} \quad 30$$

30

Divide a fraction by an integer

Q24

$\frac{4}{5} \div 4 =$

"Turn around and push it down."

$\frac{4}{5} \times \frac{1}{4} = \frac{4}{20} = \frac{1}{5}$

This doesn't have to be simplified - only give one answer

$\boxed{\frac{4}{20}}$