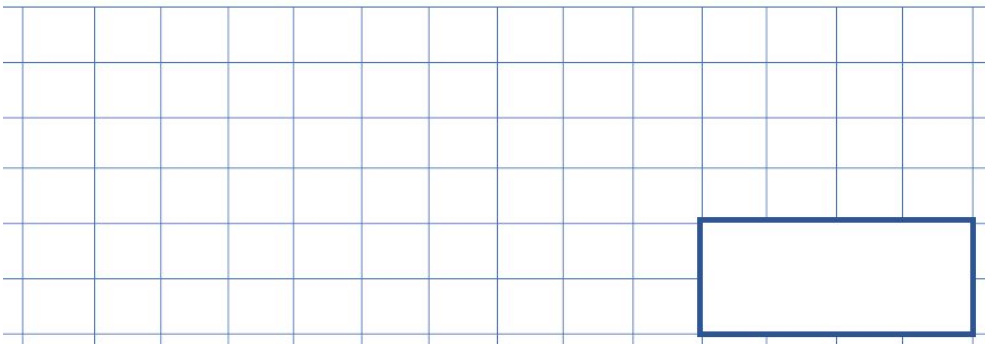


Multiplication and division

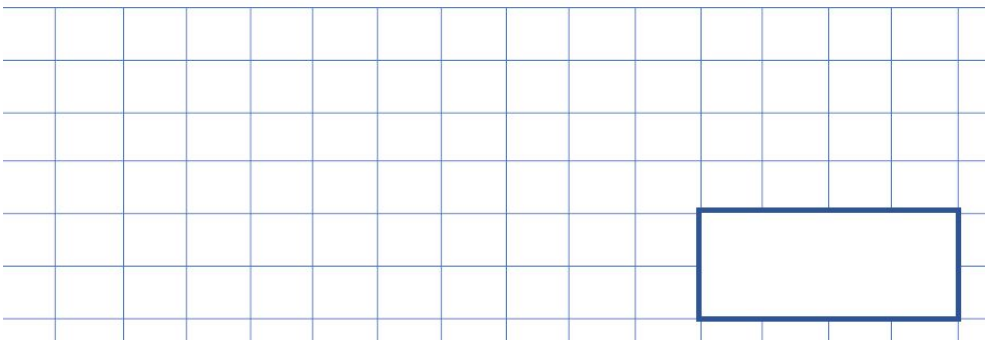
Included in this document are some examples of arithmetic style questions and reasoning style questions (like SATs) involving multiplication and division. This set of questions could be worked on over a couple of days or you may do some of it during one week and some during the next. Once you have finished, you could use a calculator to check your answers. If you make a mistake, look back and try and work out where you went wrong. I've added the calculation policy to help you if needed. You could record your work into your exercise books and send me a photograph of what you did/ a summary of how you got on. I've also added an Nrich document to this file which has a multiplication/division link but is more focussed on problem solving. You could have a go at this once you have finished these activities.

Arithmetic

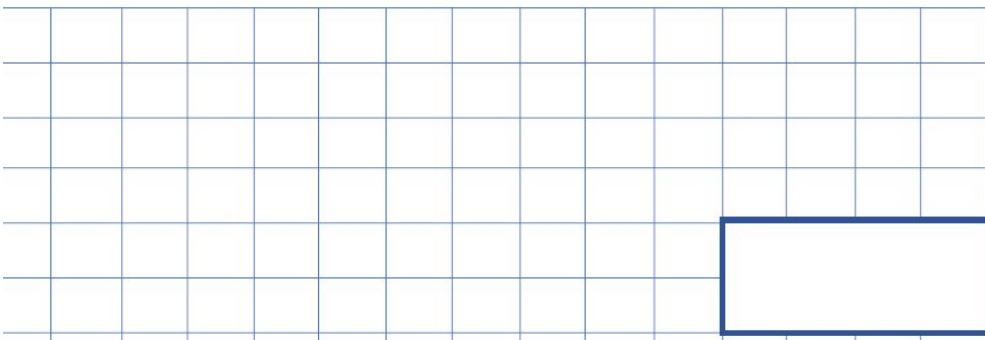
$134 \times 3 =$



$79 \div 8 =$



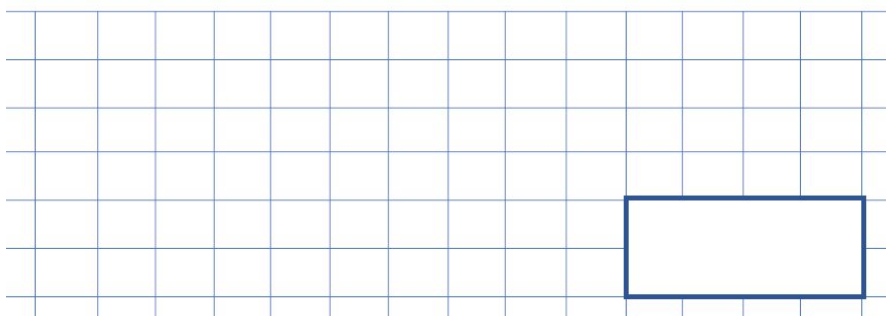
$67 \times 6 =$



$$980 \div 8 =$$

A grid consisting of 20 columns and 10 rows. A rectangular box is drawn in the bottom right corner, spanning 6 columns and 2 rows.

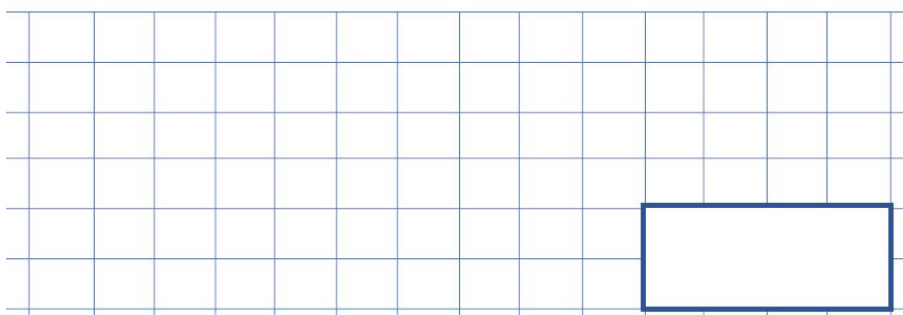
$$6 \times 5 \times 8 =$$

A grid consisting of 20 columns and 10 rows. A rectangular box is drawn in the bottom right corner, spanning 6 columns and 2 rows.

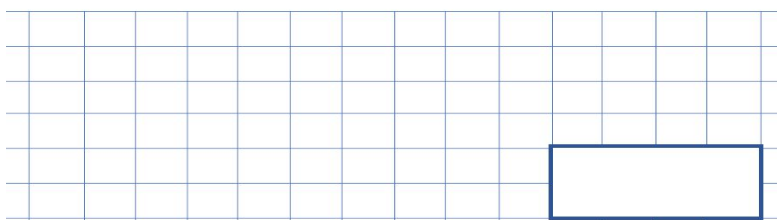
$$1,800 \div 12 =$$

A grid consisting of 20 columns and 10 rows. A rectangular box is drawn in the bottom right corner, spanning 6 columns and 2 rows.

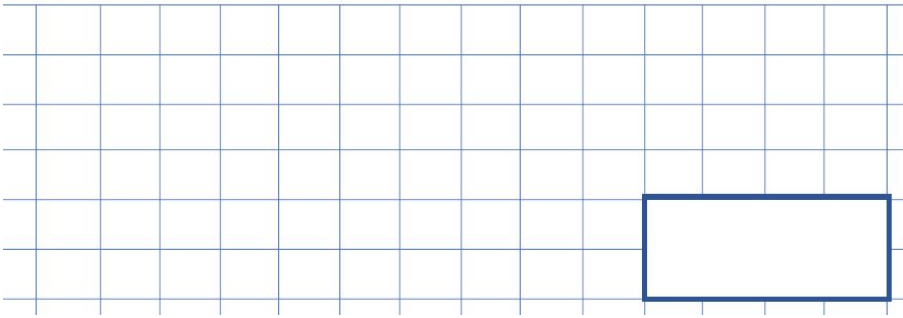
$$6,792 \div 2 =$$

A grid consisting of 20 columns and 10 rows. A rectangular box is drawn in the bottom right corner, spanning 6 columns and 2 rows.

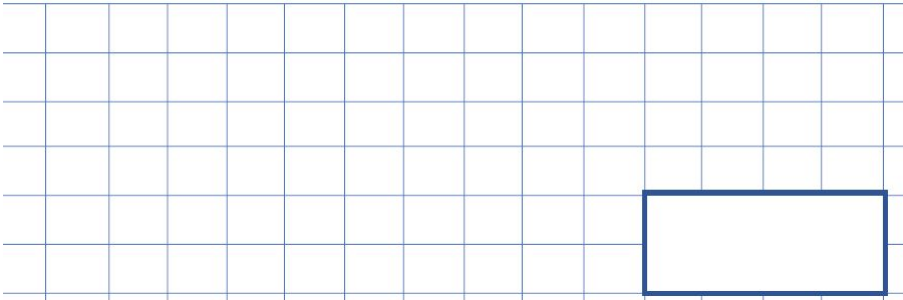
$$6^2 =$$

A grid consisting of 20 columns and 10 rows. A rectangular box is drawn in the bottom right corner, spanning 6 columns and 2 rows.

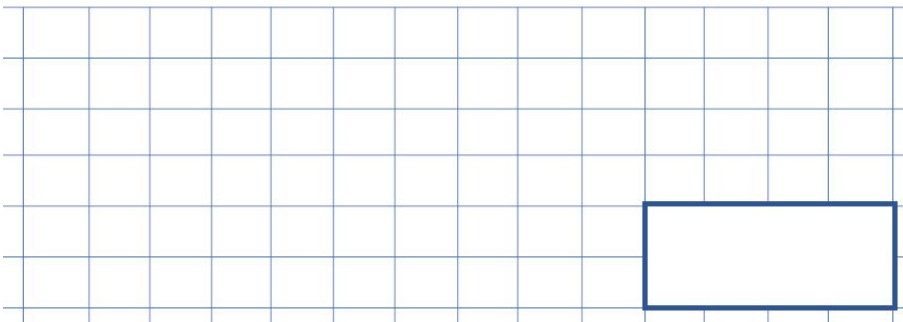
$100 \times 200 =$



$3,485 \div 5 =$



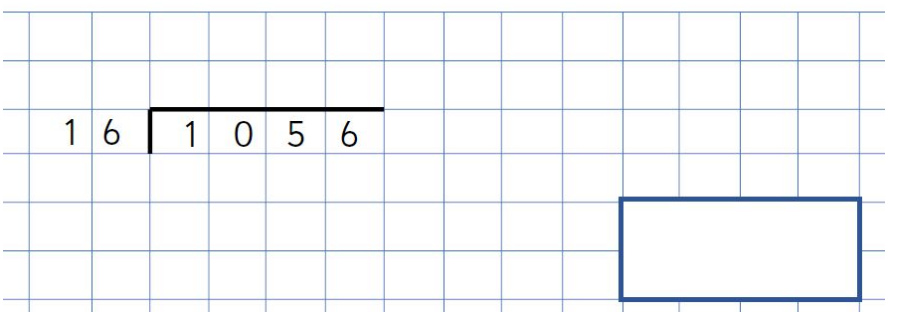
$9^2 =$



$$\begin{array}{r} 64 \\ \times 48 \\ \hline \end{array}$$



Show your method.

$$16 \overline{) 1056}$$


		6	4	2																
x			4	8																

7	9		5	3	7	2														

		7	4	2																
x			6	9																

4	3		9	3	9	3														

Reasoning

1.

Write the missing number to make this **division** correct.


$$75 \div \boxed{} = 7.5$$

2.

Each card on the left matches one on the right.

Draw lines to match the cards which are **equal** in value.

One has been done for you.

 3×6	2×25
10×5	9×2
5×8	50×2
9×10	3×30
5×20	10×4


A line connects the card 3×6 on the left to the card 9×2 on the right.

3.

At a tournament there are 7 players in each team.

There are 112 players altogether.

How many teams is this?



4.

Here are six cards.

$$\times 10$$

$$\times 100$$

$$\times 1000$$

$$\div 10$$

$$\div 100$$

$$\div 1000$$

Use a card to complete each calculation.

$$5.3 \boxed{} = 0.53$$

$$5.3 \boxed{} = 5300$$

$$5.3 \boxed{} = 0.053$$

5 and 6.

Write in the missing numbers.



$$5 \times 70 = \boxed{}$$

$$4 \times \boxed{} = 200$$

Circle two different numbers which multiply together to make 1 million.



10 100 1000 10000 100000

7.

Circle the number that is **10 times** greater than nine hundred and seven.

9,700 907 9,007 970 9,070

8.



Adam buys 6 bags of white balloons.

Chen buys 3 bags of red balloons.

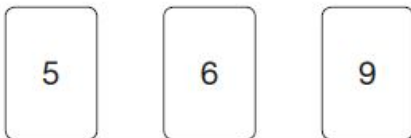
Adam says,

'I have four times as many balloons as Chen.'

Explain why Adam is correct.

9.

Chen uses these digit cards.



She makes a 2-digit number and a 1-digit number.

She multiplies them together.

Her answer is a **multiple of 10**

What could Chen's multiplication be?



10.

Write in the missing digits to make this correct.

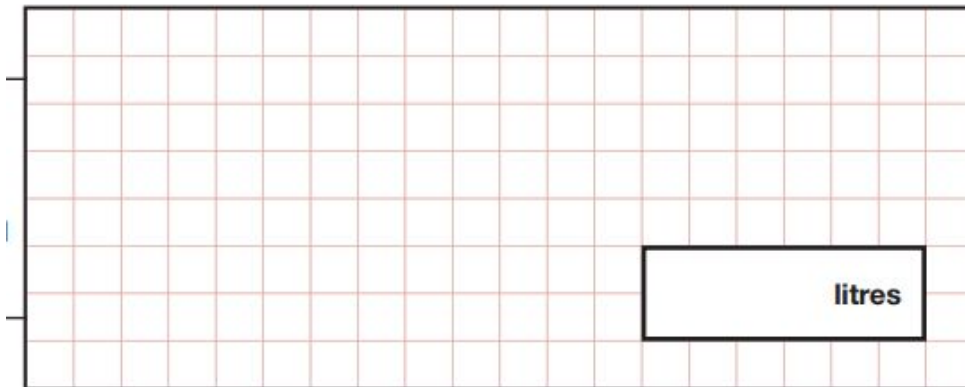


$$\begin{array}{r} \square 4 \square \\ \times \quad \quad 6 \\ \hline 2052 \end{array}$$

14.

A machine pours 250 millilitres of juice every 4 seconds.

How many **litres** of juice does the machine pour every **minute**?



15.



The International Space Station orbits the Earth at a height of 250 miles.

What is the height of the International Space Station in **kilometres**?

Use 8 kilometres equals 5 miles.

km

16.

Each bracelet has **53** beads.

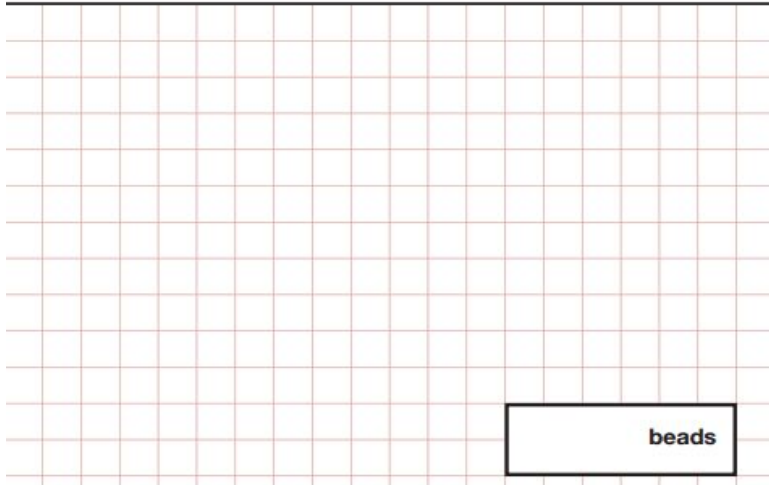
She makes **68** bracelets.



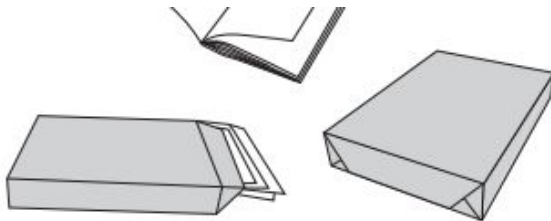
Each necklace has **105** beads.

She makes **34** necklaces.

How many beads does Layla use **altogether**?



17.



Each booklet must have **34** sheets of paper.

He has **2** packets of paper.

There are **500** sheets of paper in each packet.

How many complete booklets can Adam make from **2** packets of paper?



Extracts from the calculation policy (if needed)

Stage 5 (year 5 and 6)

Stage 5 builds on stage 4 by extending the grid method to a range of other possible calculations.

- ThHTU x U (eg 4346 x 8)
- TU x TU (eg 72 x 38) & HTU x TU (eg 372 x 24 - example 1 below)
- U.t x U (eg 4.9 x 3) & U.th x U (eg 6.73 x 7 - example 2 below)

In example 1 there are two rows in the grid - one for the tens and one for the units.

$$372 \times 24 =$$

$$E = 400 \times 25 = 10,000$$

x	300	70	2
20	6000	1400	40
4	1200	280	8

$$A = 8,928$$

$$\begin{array}{r}
 6000 \\
 1200 \\
 1400 \\
 280 \\
 40 \\
 + \quad 8 \\
 \hline
 8928 \\
 1
 \end{array}$$

$$6.73 \times 7 =$$

$$E = 7 \times 7 = 49$$

x	6	0.7	0.03
7	42	4.9	0.21

$$A = 47.11$$

Example 2 requires a good understanding of decimals.

$$\begin{array}{r}
 42 \\
 4.9 \\
 + \quad 0.21 \\
 \hline
 47.11 \\
 1
 \end{array}$$

The final stage for this operation is the standard written method of long multiplication. It is easy to see how this method develops from the grid method as the processes are the same, with each section of the grid written in a column.

$$56 \times 27 =$$

$$E = 60 \times 25 = 1500$$

$$\begin{array}{r} 56 \\ \times 27 \\ \hline \end{array}$$

Remembering to estimate first, set out the calculation lining up the tens and units. There are four calculations: 50×20 , 6×20 , 50×7 & 6×7 . Write each of these on a separate line.

$$56 \times 27 =$$

$$E = 60 \times 25 = 1500$$

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 1000 \\ 120 \\ 350 \\ 42 \\ \hline 1512 \\ \hline 1 \end{array} \quad \begin{array}{l} (50 \times 20) \\ (6 \times 20) \\ (50 \times 7) \\ (6 \times 7) \end{array}$$

Now the simple process of totalling the four lines is all that is left to do. Then check the answer against the estimate.

$$\begin{array}{r} 56 \\ \times 27 \\ \hline 1120 \\ 392 \\ \hline 1512 \end{array} \quad \begin{array}{l} (56 \times 20) \\ (56 \times 7) \end{array}$$

Once this method is understood, it can be further shortened and the four additions replaced by two

Even at this stage, many children prefer the visual nature of the grid method.

A school trip to Wimpole Hall costs £4.63 for each child. 23 children go on the trip. How much does it cost altogether?

$$E = £5 \times 23 = £115$$

x	4	0.6	0.03
20	80	12	0.6
3	12	1.8	0.09

A = £106.49

80
12
12
1.8
0.6
+ 0.09
106.49
1

Stage 5 (Year 5)

At this stage children will multiply and divide whole numbers and decimals by 10, 100 and 1000, drawing on known multiplication facts.

Children will continue to use division on a number line for some questions.

Short Division: children will begin to use formal written methods for three-digit (HTU) numbers divided by single-digit (U) numbers.

$$291 \div 3 =$$

$$E = 100$$

$$3 \overline{) 291}$$

First calculate the number of 3s in 29 - in reality this is the number of threes in 290.

$$291 \div 3 =$$

$$E = 100$$

$$3 \overline{) 291}$$

There are 9 threes, making 27...

...with 2 left over which is carried into the next column as tens.

$$291 \div 3 =$$

$$E = 100$$

$$3 \overline{) 291} \begin{array}{r} 97 \end{array}$$

$$A = 97$$

Finally, calculate the number of threes in 21.

Children should be able to interpret the remainder as a fraction or decimal, for example:

$$432 \div 5 =$$

$$E 400 \div 5 = 80$$

$$5 \overline{) 432} \begin{array}{r} 86r2 \end{array}$$

$$A = 86r2$$

$$= 86 \frac{2}{5}$$

$$432 \div 5 =$$

$$E 400 \div 5 = 80$$

$$5 \overline{) 432.0} \begin{array}{r} 86.4 \end{array}$$

$$A = 86.4$$

Stage 6 (Year 6)

Finally, long division allows us to tackle calculations where we want to divide by a two-digit number.

Children will continue to use division on a number line for some questions.

$$563 \div 24 =$$

$$E = 600 \div 25 = 24$$

$$\begin{array}{r} 2 \\ 24 \overline{) 563} \\ \underline{- 480} \\ 83 \end{array}$$

Start by finding the number of 24s in 56 (we know there are no 24s in 5). 2×24 is 48, so our first lot is 480. We can therefore put 2 in the tens column at the top (our answer) and subtract our chunk, leaving 83 to do next.

Next we look for the number of 24s in 83. As 3×24 is 72, we can put these 3 lots of 24 into our answer and again subtract the lot of 72. With 11 remaining, there are no more 24s available.

$$563 \div 24 =$$

$$E = 600 \div 25 = 24$$

$$\begin{array}{r} 23 \\ 24 \overline{) 563} \\ \underline{- 480} \\ 83 \\ \underline{- 72} \\ 11 \end{array}$$

$A = 23 \text{ r } 11$

Children should be able to interpret the remainder as a fraction or decimal, for example:

$$432 \div 15 =$$

$$E = 450 \div 15 = 30$$

$$\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{300} \quad (15 \times 20) \\ 132 \\ \underline{120} \quad (15 \times 8) \\ 12 \end{array}$$

$\frac{12}{15} = \frac{4}{5} \quad A = 28 \frac{4}{5}$

$$432 \div 15 =$$

$$E = 450 \div 15 = 30$$

$$\begin{array}{r} \overline{) 28.8} \\ 15 \overline{) 432.0} \\ \underline{30} \quad \downarrow \\ 132 \\ \underline{120} \quad \downarrow \\ 120 \\ \underline{120} \\ 0 \end{array}$$

$A = 28.8$