Division – Pencil and paper method

Expectations for each year group:

Year 3: Solve word problems involving division.
Guidance (non-statutory) Pupils develop reliable written methods for division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written method of short division.

Year 4: **Guidance** (non-statutory) Pupils practice to become fluent in the formal written method of short division with exact answers
Solve problems involving division.

Year 5: Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.
Solve problems involving division
Use all four operations to solve problems involving measures using decimal notation, including scaling.

Year 6: Divide numbers up to four-digits by a two-digit whole number using the formal written method of short division where appropriate, interpreting remainders according to context.
Solve problems involving division
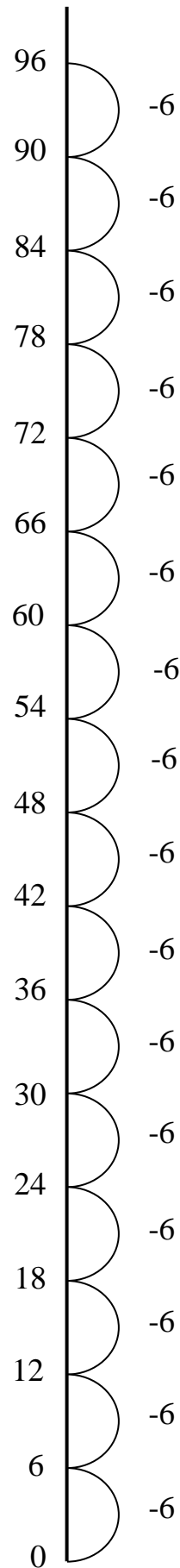Use written division methods in cases where the answer has up to two decimal places.

Key skills to support understanding:
- Arrays
- repeated subtraction
- times tables
- non-commutative i.e. the order does matter for division.
- dividing numbers by 10, 100, 1000
- patterns of similar calculations
- Grouping model of division
- Models and images

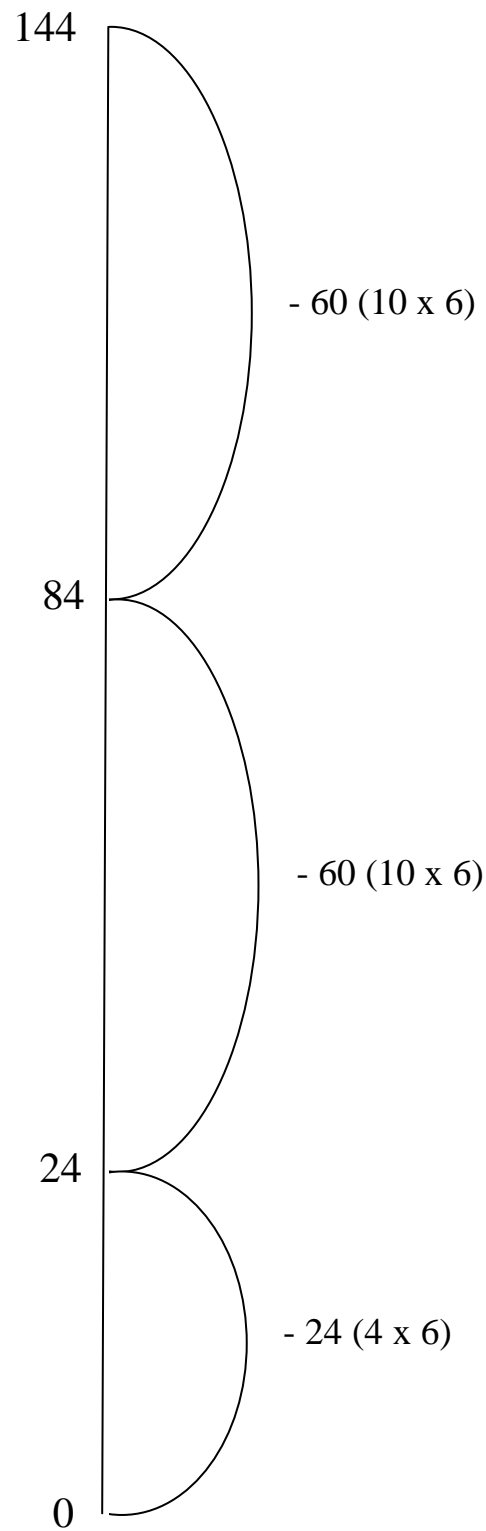# Division – Pencil and paper method

Repeated subtraction - informal

96 ÷ 6 =

```
96 ⌐
    ⌐ -6
90 ⌐
    ⌐ -6
84 ⌐
    ⌐ -6
78 ⌐
    ⌐ -6
72 ⌐
    ⌐ -6
66 ⌐
    ⌐ -6
60 ⌐
    ⌐ -6
54 ⌐
    ⌐ -6
48 ⌐
    ⌐ -6
42 ⌐
    ⌐ -6
36 ⌐
    ⌐ -6
30 ⌐
    ⌐ -6
24 ⌐
    ⌐ -6
18 ⌐
    ⌐ -6
12 ⌐
    ⌐ -6
6  ⌐
    ⌐ -6
0
```

Division – Pencil and paper method

Repeated Subtraction – chunks of multiples of 10 - informal

$144 \div 6 = 24$

144

- 60 (10 x 6)

84

- 60 (10 x 6)

24

- 24 (4 x 6)
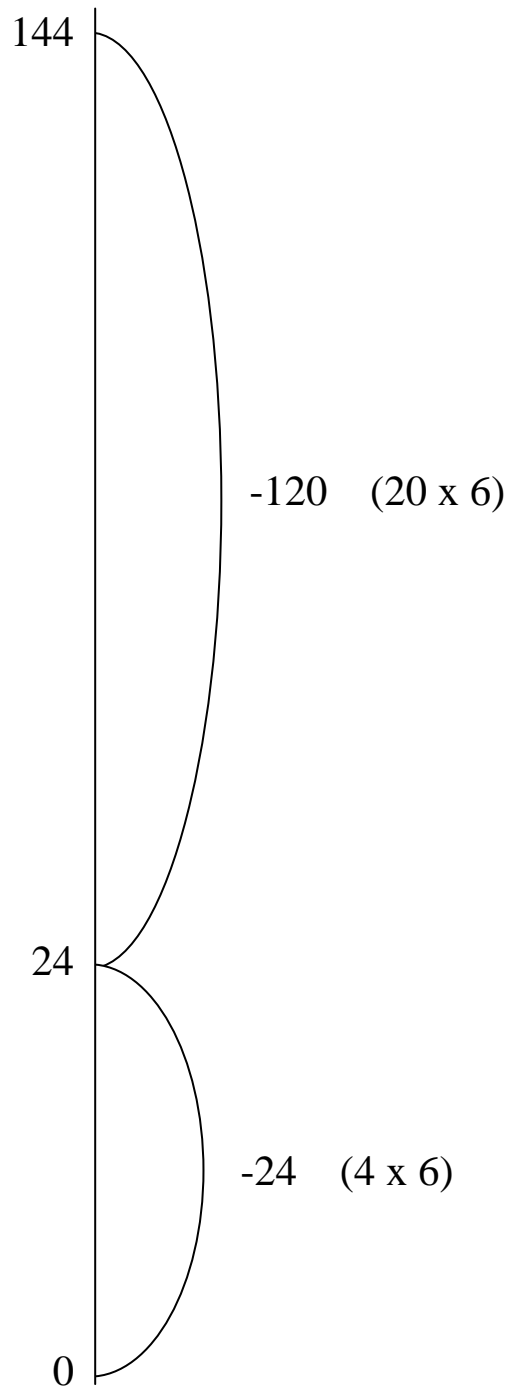
0

Division – Pencil and paper method

Repeated Subtraction – maximum chunks of multiples of 10 - informal

$144 \div 6 = 24$

144

-120   (20 x 6)

24

-24   (4 x 6)

0

Division – Pencil and paper method

Transition from repeated subtraction to multiples of the divisor - informal

Teach repeated subtraction method alongside multiples of the divisor method.

Using multiples of the divisor

HTU ÷ U

144 ÷ 6

Approximate first: 144 ÷ 6 lies between 120 ÷ 6 = 20 and 180 ÷ 6 = 30

$$
\begin{array}{r}
144 \\
-\ \underline{120} \quad (20 \times 6) \\
24 \\
\underline{24} \quad (4 \times 6) \\
0
\end{array}
$$

Answer: 24

Division – Pencil and paper method

Standard written method - formal

Short division

432 ÷ 5 = 86 remainder 2

$$
5 \overline{)43^{3}2} \quad \overset{86 \ \text{rem 2}}{}
$$

574 ÷ 15 = 38 $^4/_{15}$

$$
15 \overline{)57^{12}4} \quad \overset{38 \ ^4/_{15}}{}
$$

511 ÷ 35 = 14.6

$$
15 \overline{)51^{16}1.\ ^{21}0} \quad \overset{14.\ 6}{}
$$

Division – Pencil and paper method

Standard written method - formal

Long division

$432 \div 15 = 28$ remainder 12

```
        28
    ┌───────
 15 │ 432
      300
    ───────
      132
      120
    ───────
       12
```

$432 \div 15 = 28 \, {}^{4}/_{5}$

```
        28
    ┌───────
 15 │ 432
      300  (15 x 20)
    ───────
      132
      120  (15 x 8)
    ───────
       12
```

$${}^{12}/_{15} \quad = \quad {}^{4}/_{5}$$

Division – Pencil and paper method

432 ÷ 15 = 28.8

```
          28. 8
    15 | 432. 0
         30↓
         132
         120
          12. 0
          12. 0
              0
```