# A Q.I. Guide to Maths for Year 3
# Four Operation Methods

Pupils should be taught to:
- add and subtract numbers mentally, including: a three digit number and ones, a three digit number and tens, a three digit number and hundreds.
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
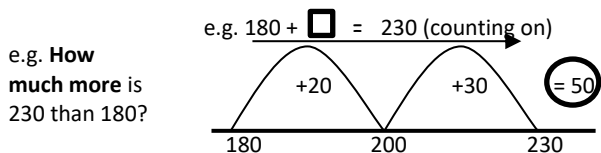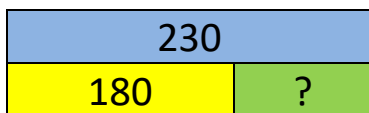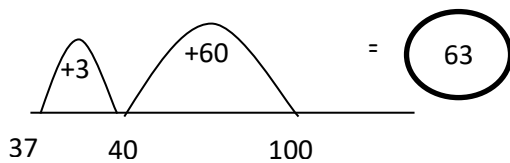
Addition strategies

Use bar model to secure understanding of addition:

?
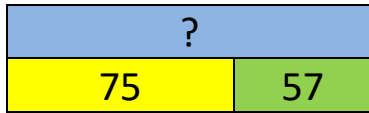
75	57

Crossing through the hundreds barrier and **bridging** the tens barrier on a **number line** e.g. 75 + 57 = 132

100

37	?
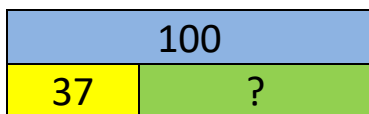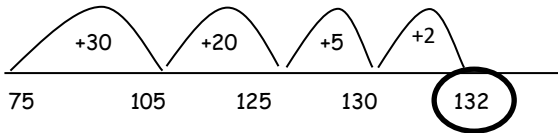
Counting up to solve **missing number problems** on a number line   e.g. 37+☐ = 100

230

180	?

e.g. **How much more** is 230 than 180?

What is the **difference** between 180 and 230?

e.g. 180 + ☐ = 230 (counting on)

Subtraction strategies

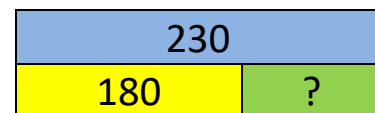**Use bar model to secure understanding of subtraction:**

156

?	77
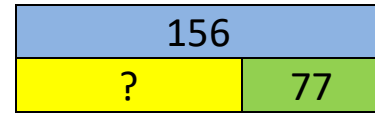
Crossing through the hundreds barrier and **bridging** through the tens barrier on a **number line**.   156 -77 = 79

132

95	?
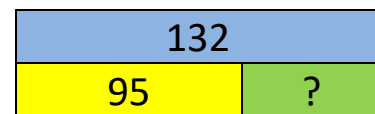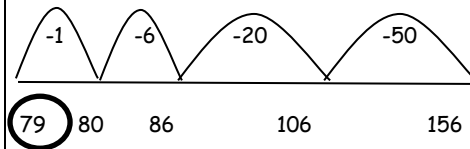
Understand how to solve subtraction problems when the two numbers are relatively close together, by counting on (*complementary addition*).
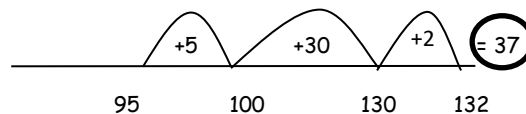
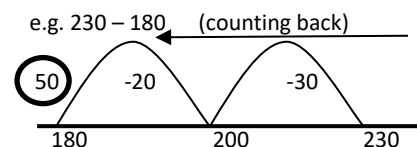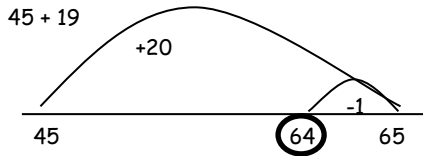**Relate subtraction to finding a difference**

230

180	?

e.g. **How much less** is 180 than 230?

What is the **difference** between 230 and 180?

e.g. 230 – 180   (counting back)

230 - ☐ = 180

Add a **near multiple** of 10 (a nearly number) using **rounding and adjusting.** 45 + 19 +20 -1 45 (64) 65	**Subtract a near multiple** of 10 (a nearly number) using **rounding and adjusting.** 96 – 39 = 57 -40 +1 56 (57) 96
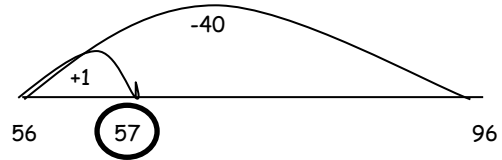
Expanded horizontal column addition

$55 + 23$

```
    50   5
  + 20   3
   70 + 8  =  78
```

$75 + 67$

```
    70   5
  + 60   7
  130 + 12  =  142
```

$375 + 67$

```
   300   70   5
  +       60   7
   300 + 130 + 12  =  442
```

Expanded horizontal column addition

$375 + 267$

```
    300   70   5
  + 200   60   7
   500 + 130 + 12  =  642
```

Expanded column subtraction, including *exchanging*.

$68 - 35$

```
      60   8
  -   30   5
      30 + 3 = 33
```

$81 - 57$

```
          70  1
          80  1
  -       50   7
          20 + 4 = 24
```

$381 - 157$

```
            70     1
    300     80     1
  - 100     50     7
    200 +  20 +  4 = 224
```

Expanded column subtraction, including **exchanging.**

$345 - 163$

```
         200  1
         300  40   5
  -      100  60   3
         100 + 80 + 2  =  182
```

Pupils should be taught to:
- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which n objects are connected to m objects.
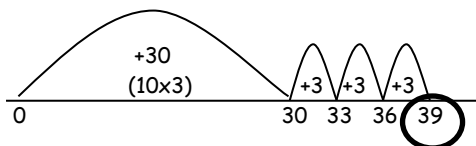
Multiplication strategies

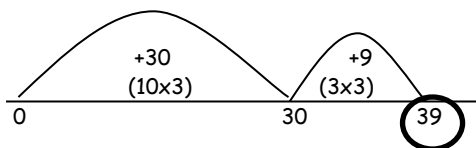**Multiplication as repeated addition**
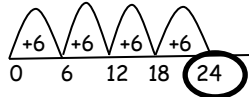
Multiplication as repeated addition using chunking
13 x 3 =39

Multiplication as repeated addition using chunking
13 x 3 =39

Multiplication using grid method 13 x 3 = 39

x	10	3
3	30	9

= 39

(Children must be able to multiply by multiples of 10 using factors knowledge: 4 x 30 = 4 x 3 x 10 e.g. 4 x 3 = 12 x 10 = 120)
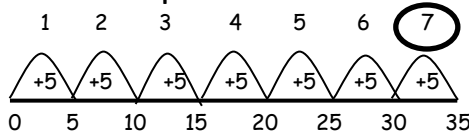
Multiplication using grid method 43 x 5
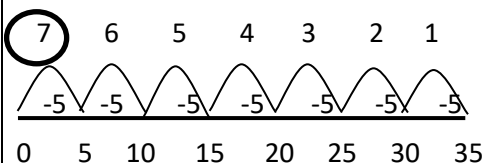
x	40	3
5	200	15

= 215

Division strategies

Division as repeated addition (and the inverse- repeated subtraction)

Division as repeated addition 35 ÷ 5 =7

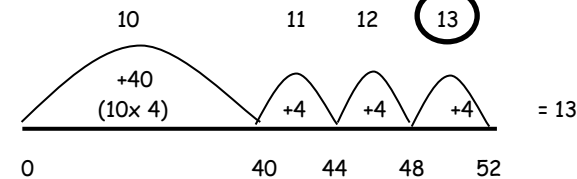**Division as repeated subtraction.** 35 ÷ 5 =7

Division as repeated addition, using chunking
52 ÷ 4 = 13

Division as repeated subtraction, using chunking
52 ÷ 4 = 13