PROGRESSION THROUGH CALCULATION FOR SUBTRACTION

The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence. *The mental calculation strategies taught will continue to be used and developed and should not be replaced by written methods.*

The following stages are standards that we expect the majority of our children to achieve.

Step 1

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.

They use numbered lines and practical resources to support calculation. Teachers demonstrate the use of the number line.
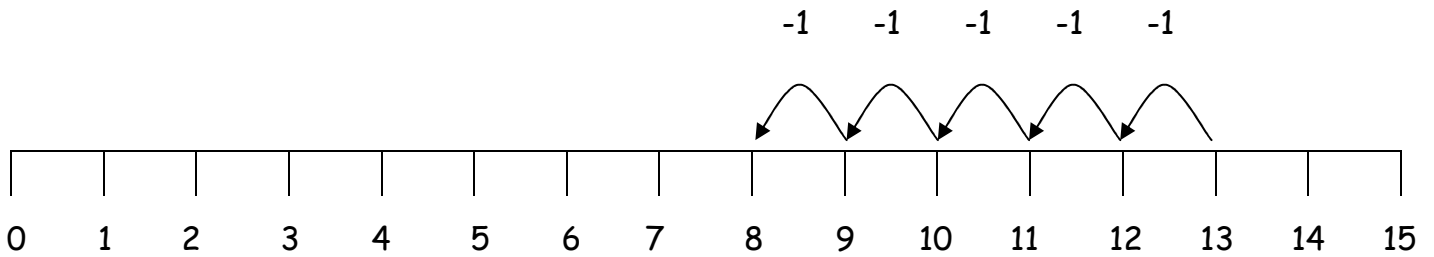
6-3 = 3
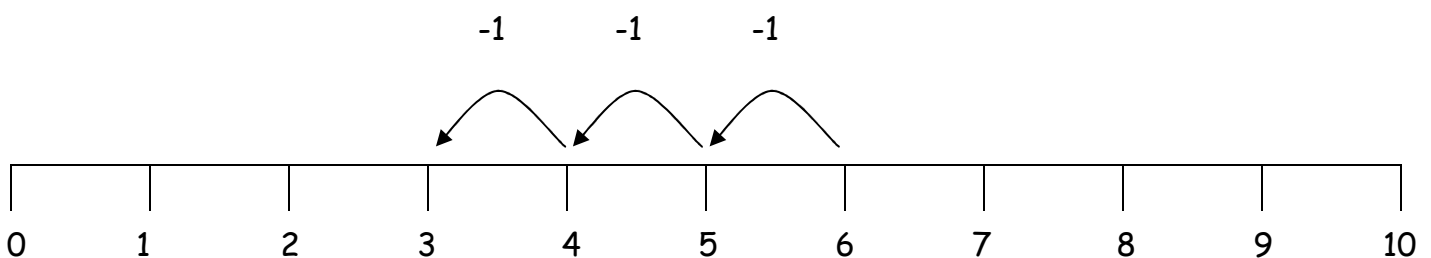
The number line should also be used to show that 6-3 means the 'difference between 6 and 3' or the 'difference between 3 and 6' and how many jumps they are apart.
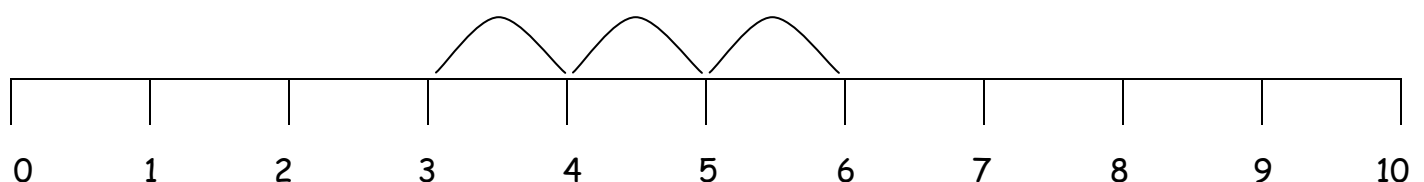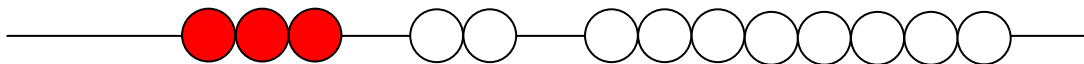
Children then begin to use numbered lines to support their own calculations – using a numbered line to count back in ones.

13 – 5 = 8

Bead strings or bead bars can be used to illustrate subtraction bridging through ten by counting back 3, then counting back 2.
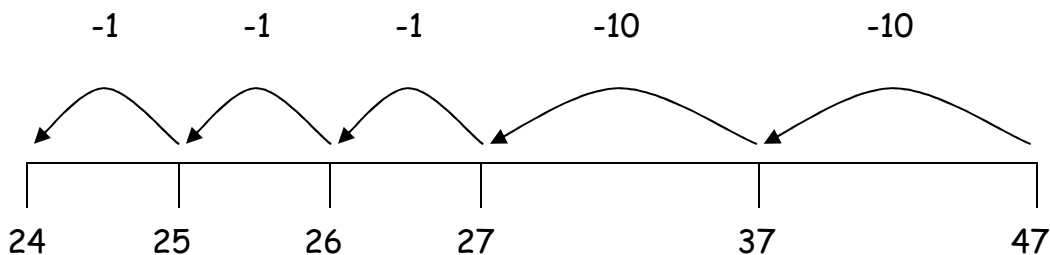
13 - 5 = 8

Step 2

Children will begin to use empty number lines to support calculations.

Counting back

> ➢ First counting back in tens and ones

47 – 23 = 24

➢ Then helping the children become more efficient by subtracting the units in one jump (by using the known fact 7 – 3 = 4)

47 – 23 = 24

-3   -10   -10

24   27   37   47
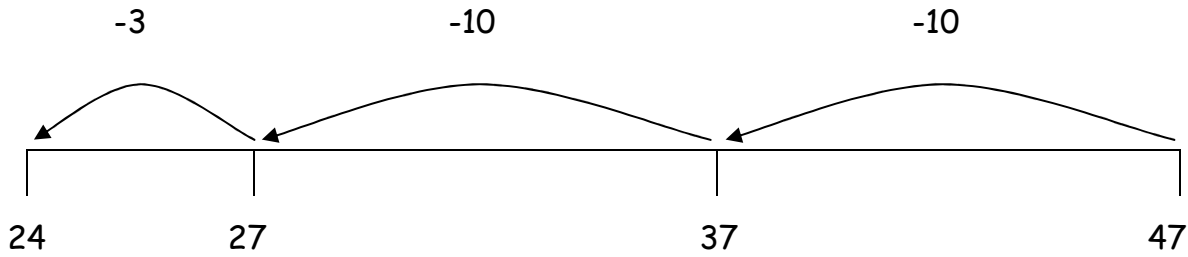
➢ Subtracting the tens in one jump and the units in one jump.

47 – 23 = 24

-3   -20

24   27   47
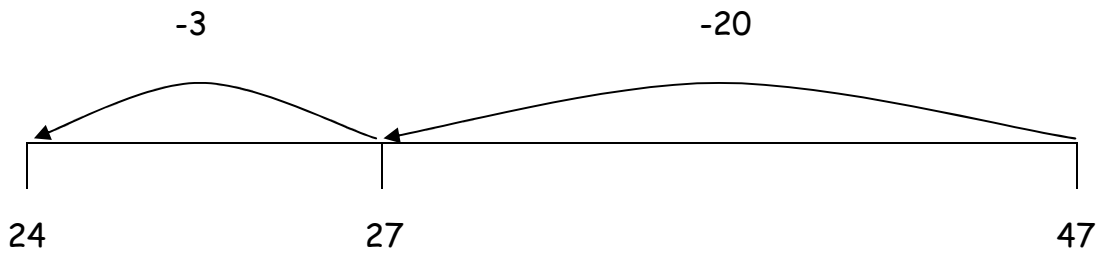
➢ Bridging through ten can help the children become more efficient.

42 – 25 = 17

-3   -2   -20

17   20   22   42

Counting on

82 – 47 = 35

Children may count up in different ways which is fine as long as it is an efficient strategy.

Help children become more efficient with counting on by:

➢ Subtracting the units in one jump
➢ Subtracting the tens in one jump and the units in one jump
➢ Bridging through ten.

Step 3

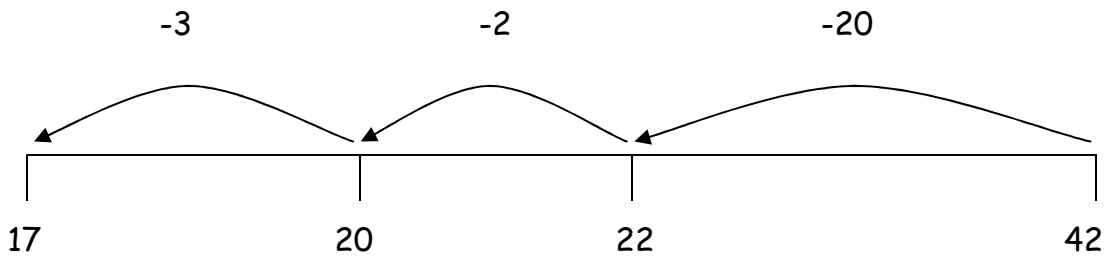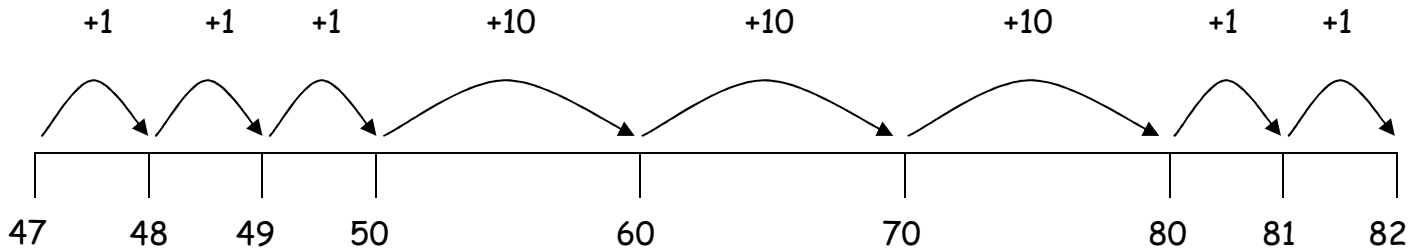Children will continue to use empty number lines with increasingly large numbers.

Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

Partitioning

This process could be demonstrated using place value arrow cards to show partitioning and base 10 materials to show decomposition of the number.

➢ Initially the children will be taught examples that do not need exchange.

```
    8  9              8  0  →  9
-   5  7          -   5  0  →  7
_____            _____
                     3  0  →  2  =  3  2
```

> From this children begin to exchange.

```
                    60        11
                   ̶7̶ 0  →  ̶1̶
  7  1            - 4 0  →  6
- 4  6            ──────────────
──────           2 0  →  5  =  2  5
```

Children should know that the units line up under units, tens under tens and so on.

> Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

102 – 89 = 13


```
+1            +10              +2
```

```
89    90                100      102
```
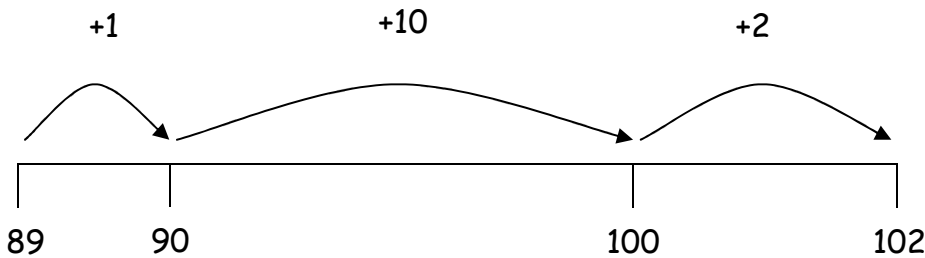
Step 4

> **Partitioning**

- Adjusting tens and units

```
                            80        14
                 7 0 0  →  ̶9̶ ̶0̶  →  ̶4̶
  7  9  4      -            8 0  →  6
-    8  6      ──────────────────────────────
──────────     7 0 0  →  0 0  →  8  =  7 0 8
```

- Adjusting hundreds and tens

```
                    600           120
                 ̶7̶ ̶0̶ ̶0̶  →  ̶2̶ ̶0̶  →  8
  7  2  8      -             8 0  →  6
-    8  6      ──────────────────────────────
──────────     6 0 0  →  4 0  →  2  =  6 4 2
```

- Adjusting hundreds, tens and units

```
                                      140
                     600             40        14
   7  5  4          7  0  0  →  5  0  →  4
-     8  6      -                   8  0  →  6
                    6  0  0  →  6  0  →  8  =  6  6  8
```

Children should:
- Be able to subtract numbers with different numbers of digits
- Using this method children should also begin to find the difference between two three digit sums of money, with or without 'adjustment' from the pence to the pounds
- Know that decimal points should line up under each other.

For example:

```
                                  0  .  8      0  .  1  5
   £  8  .  9  5      £  8  →  0  .  9  →  0  .  0  5
-  £  4  .  3  8   -  £  4  →  0  .  3  →  0  .  0  8
                     £  4  →  0  .  5  →  0  .  0  7  =  £  4  .  5  7
```

Alternatively, children can set the amounts to whole numbers, i.e. 895 – 438 and convert to pounds after the calculation.

➤ Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

551 – 197 = 314


```
    +3                  +300                 +11
```

```
197      200                        500            511
```

Stage 5

➤ Decomposition

- Initially the children will be taught examples that do not need exchange.

```
    8  9
-   5  7
    3  2
```

- From this children begin to exchange – adjusting tens and units.

```
  6   1              8   1
  7̶   1          7  9̶   4
-  4   6          -     8   6
   2   5              7   0   8
```

- Adjusting hundreds and tens

```
  6   1
  7̶   2   8
-         8   6
   6   4   2
```

- Adjusting hundreds, tens and units

```
      1
  6   4   1
  7̶   5̶   4
-         8   6
   6   6   8
```

Children should:
- Be able to subtract numbers with different numbers of digits
- Using this method children should also begin to find the difference between two three digit sums of money, with or without 'adjustment' from the pence to the pounds, as well as subtracting any decimal numbers.
- Know that decimal points should line up under each other.

For example:

```
          8   1
  £  8  .  9̶   5
- £  4  .  3   8
  £  4  .  5   7
```

By the end of Year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved. If calculating time, children should use a number line.

Children should not go onto the next stage if:
    1. they are not ready.
    2. they are not confident.

Children should be encouraged to approximate their answers before calculating. Children should be encouraged to check their answers after calculation using an appropriate strategy.