



## Addition



### Number bonds

Knowing (not working out) pairs of numbers which total to 10, 20 and 100

$3 + 7$ ,  $13 + 7$ ,  $30 + 70$ ...

### Counting on and back

Counting in steps of 1, 10, 100, 1000...

$86 + 52 = 138$  by counting on in 10s then in 1s

### Rounding and adjusting

Add the nearest multiple of 10, 100, 1000 and adjust

$24 + 19 \Rightarrow 24 + 20 - 1 = 43$

### Relationships

Addition and subtraction are inverse operations so you can 'work backwards'

$23 - 17 = 6$  so we know  $17 + 6 = 23$

### Doubles and near doubles

$6 + 6 = 12$ ,  $6 + 7 =$  double 6 and 1 more = 13

### Partitioning

Splitting a number up and then recombining it

$34 + 45 \Rightarrow (30 + 40) + (4 + 5) = 70 + 9 = 79$

### Bridging

Using number bonds to split numbers

$17 + 7 \Rightarrow 17 + (3 + 4) = 20 + 4 = 24$

### Using related facts

$4 + 9 = 13$  so we know  $40 + 90 = 130$

## Subtraction

### Number bonds

Using number facts we know

$20 - 17 = 3$ ,  $100 - 70 = 30$

### Counting on and back

Counting on and back in repeated steps of 1, 10, 100...

$86 - 32 = 54$  by counting back in 10s and in 1s

Find a small difference by counting up

$101 - 98 \Rightarrow$  from 98, we jump to 99, 100, 101... three jumps = 3

### Rounding and adjusting

Subtract the nearest multiple of 10, 100... and adjust

$74 - 19 = 74 - 20$  and then add the 1 back on = 55

### Relationships

Addition and subtraction are inverse operations so you can 'work backwards'

$17 + 6 = 23$  so we know  $23 - 6 = 17$

### Partitioning

Splitting a number up then recombining it

$89 - 36 \Rightarrow (80 - 30) + (9 - 6) = 50 + 3 = 53$

### Bridging

Using number bonds to split numbers up

$14 - 6 \Rightarrow 14 - 4 - 2 = 10 - 2 = 8$



## Multiplication

### Times tables

Knowing (not working out) multiplication facts

Y2  $\rightarrow$   $\times 2$   $\times 5$   $\times 10$

Y3  $\rightarrow$   $\times 3$   $\times 4$   $\times 8$

Y4  $\rightarrow$  recall all facts up to  $12 \times 12$  quickly

Knowing the effect of  $\times 0$  and  $\times 1$

### Doubling... and doubling again

$13 \times 2 = 26$ , so  $13 \times 4 = 52$  and  $13 \times 8 = 104$

### Using related facts

$8 \times 6$  is double  $4 \times 6$

$24 \times 5 = (24 \times 10)$  then half it = 120

$12 \times 15 = 12 \times 5 \times 3 = 60 \times 3 = 180$



### Multiplying by 10, 100, 1000...

$63 \times 10 = 630$  (and  $6.3 \times 10 = 63$  etc)

### Partitioning

$23 \times 6 \Rightarrow (20 \times 6) + (3 \times 6) = 120 + 18 = 138$

$13 \times 12 \Rightarrow (13 \times 10) + (13 \times 2) = 130 + 26 = 156$

### Relationships

Multiplication is repeated addition

$14 \times 3 = 14 + 14 + 14 = 42$

Multiplication and division are inverse operations so you can 'work backwards'

## Division

### Times tables

Multiplication and division are inverse operations so you can 'work backwards'

$8 \times 7 = 56$  so we know  $56 \div 8 = 7$

### Halving

Halving is  $\div 2$

Halving and halving again is  $\div 4$  (and finding  $\frac{1}{4}$  or 25%)

$64 \div 4 = 64$  halved (32) and then halved again = 16

### Dividing by 10, 100, 1000...

$750 \div 10 = 75$  (and  $750 \div 100 = 7.5$ )

### Relationships

Division can be seen as repeated subtraction

$24 \div 6 \Rightarrow$  starting at 24, we take off 6s  $\Rightarrow$  18, 12, 6, 0 = 4 groups

Division can be worked out by repeatedly adding, too

$24 \div 6 \Rightarrow$  from 0, we jump to 6, 12, 18, 24...

4 jumps = 4

If I know  $3 \times 7 = 21$ ,

what else do I know?

$30 \times 7 = 210$ ,

$0.3 \times 7 = 2.1$  etc

