# MENTAL CALCULATIONS

MOORTOWN Primary School

## 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 ➡ 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 ➡ (30 + 40) + (4 + 5) = 70 + 9 = 79

**Bridging**
Using number bonds to split numbers
17 + 7 ➡ 17 + (3 + 4) = 20 + 4 = 24

**Using related facts**
4 + 9 = 13 so we know 40 + 90 = 130

**Equivalent calculations**
Use knowledge of structure: increase one number and decrease the other by the same amount
49 + 6 = 50 + 5

## Multiplication

**Times tables**
Knowing (not working out) facts
**Y2** → x2, x5 x10 **Y3** → x3, x4, x8
Y4 → all facts up to 12 x 12 quickly
Knowing the effect of x0 and x1

**Doubling… and doubling again**
13 x 2 = 26, so 13 x 4 = 52 and 13 x 8 = 104

**Using related facts**
8 x 6 is double 4 x 6
24 x 5 = (24 x 10) then half it = 120
12 x 15 = 12 x 5 x 3 = 60 x 3 = 180

**Multiplying by 10, 100, 1000…**
63 x 10 = 630 (and 6.3 x 10 = 63 etc)

**Partitioning**
23 x 6 ➡ (20 x 6) + (3 x 6) = 120 + 18 = 138
13 x 12 ➡ (13 x 10) + (13 x 2) = 130 + 26 = 156

**Relationships**
Multiplication is repeated addition
14 x 3 = 14 + 14 + 14 = 42
Multiplication and division are inverse operations so you can 'work backwards'

**Rounding and adjusting**
99 x 5 ➡ 100 x 5 - 5 = 495

**Equivalent calculations**
Use knowledge of structure: apply a multiplicative increase to one factor and a corresponding decrease the other
18 x 6 = 9 x 12

## 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 ➡ from 98, jump to 99, 100, 101…three jumps

**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 ➡ (80 - 30) + (9 - 6) = 50 + 3 = 53

**Bridging**
Using number bonds to split numbers up
14 – 6 ➡ 14 – 4 – 2 = 10 – 2 = 8

**Equivalent calculations**
Use knowledge of structure: increase **or** decrease both numbers by the same amount
601 - 278 = 599 – 276

## Division

**Times tables**
Multiplication and division are inverse operations so you can 'work backwards'
8 x 7 = 56 so we know 56 ÷ 8 = 7

**Halving**
Halving is ÷2
Halving and halving again is ÷4 (and finding ¼ or 25%)
64 ÷ 4 = 64 halved (32) and then halved again = 16

**Dividing by 10, 100, 1000…**
750 ÷ 10 = 75 (and 750 ÷ 100 = 7.5)

**Relationships**
Division can be seen as repeated subtraction
24 ÷ 6 ➡ starting at 24, we take off 6s ➡ 18, 12, 6, 0 = 4 groups
Division can be worked out by repeatedly adding, too
24 ÷ 6 ➡ from 0, we jump to 6, 12, 18, 24…
4 jumps = 4
If I know 3 x 7 = 21, what else do I know?
30 x 7 = 210,
0.3 x 7 = 2.1 etc

**Equivalent calculations**
Use knowledge of structure: apply a multiplicative increase **or** decrease to both numbers
600 ÷ 50 = 60 ÷ 5