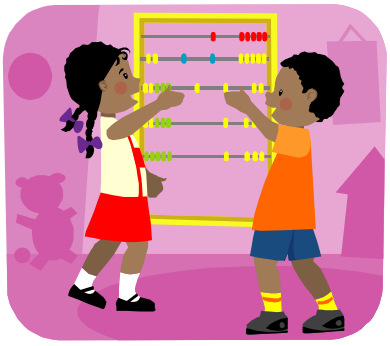
St. Peter's Catholic Primary School

Helping your child with written calculations in Maths



Introduction

This booklet is designed to illustrate the variety of approaches to solving number problems that your child will be taught at our school.

Why Write It?

Calculations may be recorded:

- to make informal jottings of the steps on the way to an answer
- to develop the skill of explaining the method used
- to help someone else follow that method, perhaps to assess their work
- to practise writing and using correct symbols and notation (e.g. + - x ÷)
- to help remember or to practise the recall of number facts (e.g. 7+3 =10 70+30=100)
- to carry out the working of a standard written method of calculation

ADDITION

Skills in Early Addition

- Counting all – a child doing 2 + 3 counts out two bricks and then three bricks and then finds the total by counting all the bricks.

- Counting on from the first number – a child finding 3 + 5 counts on from the first number; 'four, five, six, seven, eight'.

- Counting on from the larger number – a child chooses the larger number, even when it is not the first number and counts on from there.

Mental Skills in Addition

- Using a known addition fact – where a child gives an immediate response to facts known by heart, such as 6+4 or 3+3 or 10+8.

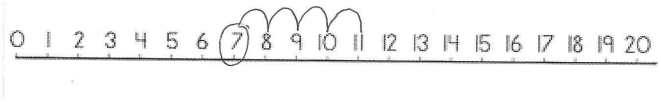
- Using a known fact to derive a new fact – where a child uses a number bond that they know by heart to calculate one that she or he does not know, e.g. using knowledge that 5+5=10 to work out 5+6=11 and 5+7=12.

- Using knowledge of place value – where a child uses knowledge that 4+3=7 to work out 40+30=70, or knowledge that 46+10=56 to work out 46+11=57.

Stages in Addition

1. Using a Number Line or 100 Square to count on in ones.

   7 + 4 = 11



   16 + 9 = 25

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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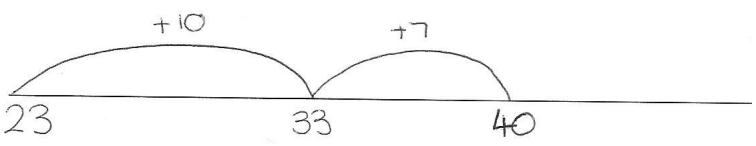
2. Using Empty Number Lines

   23 + 17 =

   23 + 10 + 7 =



3. Vertical layout – expanded working, moving to adding the least significant digit first and extending to three digit numbers. Partial sums are added mentally.

```
   4  7
+  7  6
   1  3      = 7 + 6
1  1  0      = 70 + 40
1  2  3
```

```
   3  6  8
+  4  9  3
      1  1   = 8 + 3
   1  5  0   = 60 + 90
   7  0  0   = 300 + 400
   8  6  1
```

4. Vertical layout, contracting the working to a compact, efficient form:

```
   T  U              H  T  U
   4  7              3  6  8
+  7  6           +  4  9  3
1  2  3              8  6  1
1  1                 1  1
```

Language used in compact methods

```
   5  4  7
+  2  7  6
   8  2  3
   1  1
```

- Seven plus six equals thirteen, write down three and carry ten (child writes carry digit underneath)
- Forty plus seventy equals one hundred and ten, plus the extra ten, which equals one hundred and twenty. Write down twenty and carry one hundred (child writes carry digit underneath)
- Five hundred plus two hundred equals seven hundred, plus the extra one hundred, which equals eight hundred.
- The total is eight hundred and twenty-three.

SUBTRACTION

Skills in Early Subtraction

- Counting out – a child finding 9 – 3 holds up nine fingers and folds down three.
- Counting back from – a child finding 9 – 3 counts back three numbers from 9; ‘eight, seven, six’.
- Counting back to – a child doing 11 – 7 counts back from the first number to the second, keeping a tally using fingers of the number of numbers that have been said, ‘ten, nine, eight, seven’, holding up four fingers.
- Counting up – a child doing 11 – 7 counts up from 7 to 11, ‘eight, nine, ten, eleven’, sometimes keeping a count of the spoken numbers using fingers (not a ‘natural’ strategy for many children because of the widely held perception of subtraction as ‘taking away’).

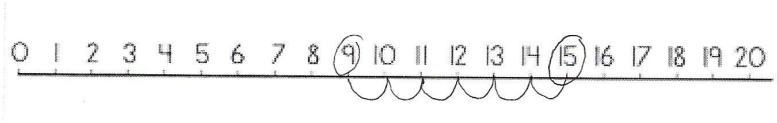
Mental Skills in Subtraction

- Using a known fact – a child gives a rapid response based on facts known by heart, such as 8 – 3 or 20 – 8.
- Using a derived fact – a child uses a known fact to work out a new one, e.g. 20 – 5 is 15, so 20 – 6 must be 14 (more unusual in subtraction than in addition).
- Using knowledge of place value – a child finding 25-9 knows that 25-10 is 15, and uses this to give an answer of 16.

Stages in Subtraction

1. Using a Number Line or 100 Square to count back in ones.

15 – 6 = 9



15 - 13 = 2

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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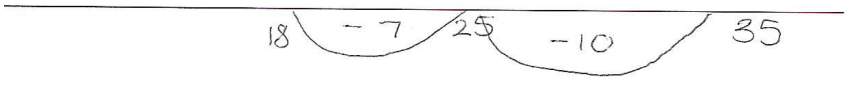
2. Using Empty Number Lines

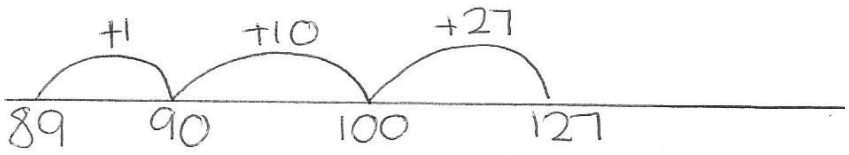
35 - 17 =

35 - 10 - 7 =



3. Finding the Difference on a Number Line

127 – 89



4. Finding the Difference by Counting On

$$
\begin{array}{rl}
1\ 2\ 7 & \\
\ \ 8\ 9 & - \\
\hline
\ \ \ \ 1 & +\ (90) \\
1\ 0 & +\ (100) \\
\ \ 2\ 7 & +\ (127 \\
\hline
\ \ 3\ 8 &
\end{array}
$$

5. Subtraction Using the Compact Method

$$
\begin{array}{rl}
{}^{0}\cancel{1}\ {}^{11}\cancel{2}\ {}^{1}7 & \\
\ \ 8\ \ 9 & - \\
\hline
\ \ 3\ \ 8 &
\end{array}
$$

MULTIPLICATION

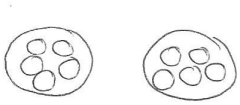
Mental Skills in Multiplication

- Starting with tables for 2 and 10, knowing by heart facts such as ‘seven twos’ or ‘four tens’, progressing to facts in the 5 times-table, then others.
- Recognising that multiplication can be done in any order – e.g. realising that 5 x 2 is the same as 2 x 5.
- Doubling two digit numbers – double 10, 20, 30, 40 …. then, for example, double 23 as double 20 plus double 3.
- Using doubling e.g. working out the 4 times-table by doubling the 2 times-table.
- Using related facts – e.g. 5 x 4 = 20 to find 6 x 4 = 24.
- Knowing by heart the 3 and 4 times-table.
- Recognising the effect of multiplying a number by 10.
- Approximating, e.g. working out 19 x 17 by doing 20 x 17 and then subtracting 17.

Stages in Multiplication

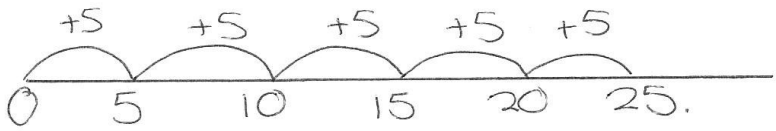
1. Working out ‘groups of’ 2, 5 and 10

5 x 2 = 10



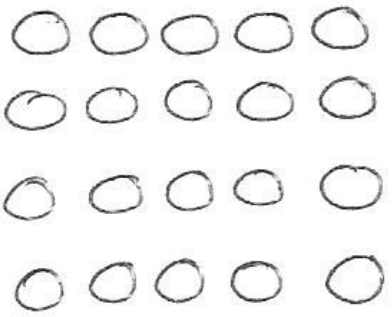
2. Repeated Addition on a Number Line

5 x 5 = 25



3. Using Arrays

5 x 4 = 20



4. The Grid Method

12 x 5 =

	10	2
5	50	10

= 50 + 10 = 60

12 x 12 =

	10	2
10	100	20
2	20	4

= 100 + 20 + 20 + 4
= 144

5. The Column Method (1)

123 x 6 =

1	2	3	
		6	X
	1	8	(u)
1	2	0	(T)
6	0	0	(H)
7	3	8	

6. The Column Method (2)

123 x 6 =

1	2	3	
		6	X
7	3	8	
1	1		

7. The Column Method (3)

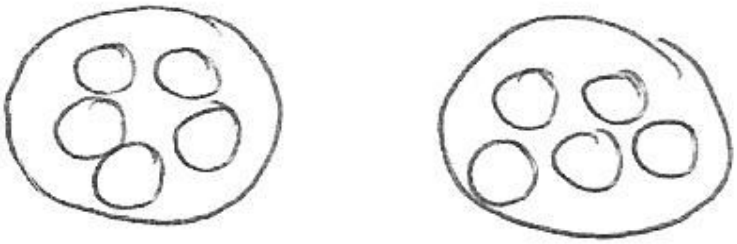
123 x 24 =

	1	2	3		
		2	4	X	
	4	9	2		123 x 4
2	4	6	0		123 x 20

DIVISION

1. Sharing

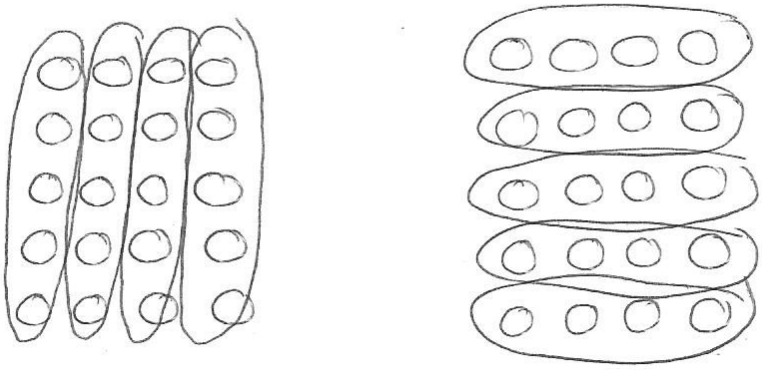
10 ÷ 2 = 5



2. Grouping

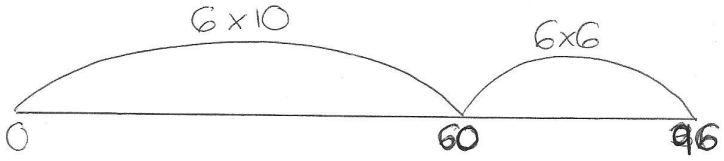
10 ÷ 2 = 5

3. Using Arrays (starting with 2's, 5's, 10's and then move onto 3's and 4's)



4. Using a Number Line

96 ÷ 6 = 16



5. Short Division (1)

96 ÷ 6 =

6	9	6	
	6	0	10 x 6
	3	6	
	3	6	6 x 6
		0	

6. Short Division (2)

	1	6
6	9	$^{3}6$

7. Long Division

742 ÷ 25

25	7	4	2	
	2	5	0	x 10
	4	9	2	
	2	5	0	X 10
	2	4	2	
	1	2	5	X 5
	1	1	7	
	1	0	0	X 4
		1	7	

= 29 r. 17