



We aim for all children at Holy Trinity to be able to:

- **Develop mathematical fluency**
- **Reason mathematically**
- **Problem solve**
- **Make connections across mathematical ideas**
- **Apply knowledge in other subject areas**

MATHS INFORMATION BOOKLET

YEAR 6

YEAR SIX STRATEGIES

Here are the strategies that you can use to help develop your child's addition, subtraction, multiplication and division skills.

MENTAL ADDITION AND SUBTRACTION STRATEGIES

Before column addition and subtraction children need to be competent in:

Partition into Hundreds, Tens and ones

- For example work out mentally that

$$324 + 58 = 382 \text{ because it is}$$

$$320 + 50 = 370 \text{ and } 4 + 8 = 12 \text{ or } 370 + 12 \text{ is } 382$$

Identify near doubles

- For example work out mentally that $1.5 + 1.6 = 3.1$ because you can double 1.5 and then add 0.1

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

- Add 9, 19, 29 or 11, 21, 31.... By adding 10, 20, 30... then adjusting by 1.

- $458 + 71 = 529$

Is the same as $458 + 70$ and then add 1

- $583 - 71 = 512$

Is the same as $583 - 70$ then take away 1.

Add several numbers

Work mentally to complete questions such as

$$27 + 36 + 13 =$$

Using strategies such as

- Looking for pairs that make 10
- Starting with the largest number

Find a difference by counting up through the next multiple of 10, 100 or 1000.

- Work out by counting up from the smaller to the larger number.

$$92-89$$

$$403-386 \text{ and}$$

$$4000-3993$$

Use known number facts to add or subtract a pair of numbers.

Using multiple of 10

- $573 + 252 = 500+200+70+50+3+2=825$
- $625 - 382 = 600-300-20-80-5-2=193$

Using multiples of 1000

- $525 + 705 = 500 + 700 + 25 + 5 = 1230$
- $1200 - 450 = 1200 - 400 - 50 = 750$

Find what to add to a decimal to make the next higher whole
 $3.4 + \underline{\quad} = 4$ $4.8 + \underline{\quad} = 5$

Find a difference between a pair of numbers by counting up.

$7003 - 6899 = 104$ by counting up 1 from 6899 to 6900 then 100 to 7000 then 3 to 7003.
 In the lower school children use a number line to count on.

WRITTEN METHODS FOR ADDITION AND SUBTRACTION

Children should be able to use pencil and paper methods to support, record or explain calculations, achieving consistent accuracy. Encourage them to discuss, explain and compare different methods.

When using written methods that are set out in columns, remind the children that ones should line up under ones, tens under tens etc.

Column Addition and Subtraction

<p>789 + 642 becomes</p> $\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline 1 \end{array}$ <p>Answer: 1431</p>	<p>874 - 523 becomes</p> $\begin{array}{r} 874 \\ - 523 \\ \hline 351 \\ \hline \end{array}$ <p>Answer: 351</p>	<p>932 - 457 becomes</p> $\begin{array}{r} 8 \quad 12 \quad 1 \\ \cancel{9} \quad \cancel{3} \quad 2 \\ - 4 \quad 5 \quad 7 \\ \hline 4 \quad 7 \quad 5 \\ \hline \end{array}$ <p>Answer: 475</p>	<p>932 - 457 becomes</p> $\begin{array}{r} \quad 1 \quad 1 \\ 9 \quad 3 \quad 2 \\ - \cancel{4} \quad \cancel{5} \quad 7 \\ \quad 5 \quad 6 \\ \hline 4 \quad 7 \quad 5 \\ \hline \end{array}$ <p>Answer: 475</p>
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Decimals

When adding decimals choose one of the methods above. Remind children that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts such as 3.2 m + 350 cm or 72.5km + 54.6 km.

Adding and Subtracting fractions

There are 3 Simple Steps to add fractions with same denominator:

$$\frac{1}{4} + \frac{1}{4}$$

Step 1. The bottom numbers (the denominators) are already the same.

Step 2. Add the top numbers and put the answer over the same denominator:

$$\frac{1}{4} + \frac{1}{4} = \frac{1+1}{4} = \frac{2}{4}$$

Step 3. Simplify the fraction:

$$\frac{2}{4} = \frac{1}{2}$$

Adding fractions where the denominator of one fraction is a multiple of the other

$$\frac{1}{6} + \frac{1}{3}$$

Step 1: The bottom numbers are different. We need to make them the same before we can continue, because we **can't** add them like that.

The number "6" is twice as big as "3", so to make the bottom numbers the same we can multiply the top and bottom of the first fraction by **2**, like this:

$$\begin{array}{c} \times 2 \\ \curvearrowright \\ \frac{1}{3} = \frac{2}{6} \\ \curvearrowleft \\ \times 2 \end{array}$$

Important: you multiply **both top and bottom** by the same amount, to keep the value of the fraction the same

Now the fractions have the same bottom number ("6"), and our question looks like **this**:

$$\frac{1}{6} + \frac{2}{6}$$

The bottom numbers are now the same, so we can go to step 2.

Step 2: Add the top numbers and put them over the same denominator:

$$\frac{1}{6} + \frac{2}{6} = \frac{1+2}{6} = \frac{3}{6}$$

Step 3: Simplify the fraction:

$$\frac{3}{6} = \frac{1}{2}$$

Subtracting fractions:

With same denominator-

$$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$$

Subtracting fractions where the denominator of one fraction is a multiple of the other

$$\frac{3}{6} - \frac{1}{3} = \frac{3-2}{6} = \frac{1}{6}$$

Adding Fractions where you find the lowest (least) Common Denominator (LCD)

$$\frac{3}{4} + \frac{2}{5} \quad \text{LCD is} \quad \underline{20}$$

Divide denominator of each into the LCD and multiply by how many you have

i.e. $\frac{3}{4} \quad \underline{20}$

$$\text{How many 4's in 20} = 5 \times 3 = 15$$

$$\text{How many 5's in 20} = 4 \times 2 = 8$$

$$\text{So } \frac{3}{4} + \frac{2}{5} = \frac{15 + 3}{20} = \frac{23}{20}$$

Change to mixed number fraction $1\frac{3}{20}$.

The same applies to Subtraction, you need to find the LCD.

Multiplication and Division of Fractions

Multiply simple pairs of proper fractions, writing answer in simplest form:

i.e. $\frac{1}{4} \times \frac{1}{2}$

know that when you multiply by a whole number you place it over 1

$$\text{i.e. } 3 \times \frac{3}{8} = \frac{3}{1} \times \frac{3}{8} = \frac{9}{8} = 1\frac{1}{8}$$

When dividing fractions you change the operation sign to \times and invert 2nd fraction

$$\text{i.e. } \frac{3}{8} \div \frac{1}{3} = \frac{3}{8} \times \frac{3}{1} = \frac{9}{8} = 1\frac{1}{8}$$

MENTAL METHODS FOR MULTIPLICATION AND DIVISION

Doubling and Halving

Use related facts and doubling or halving

For example: Double 78 is double 70 add double 8 or $140 + 16 = 156$

Half of 256 is half of 200, half of 50 plus half of 6 is 128

Double a number ending in 5 and then halve the other number

For example

16×5 is equivalent $8 \times 10 = 80$ or 35×14 is the equivalent of $70 \times 7 = 490$.

Halve an even number in the calculation , find the product, then double it

For example

13×14	16×51
$13 \times 7 = 91$	$8 \times 51 = 408$
$91 \times 2 = 182$	$408 \times 2 = 816$.

To multiply by 50, Times by 100 and then halve

For example

36×50 is $36 \times 100 = 3600$ $3600 \div 2 = 1800$

Find sixths by having thirds and finding twentieths by halving tenths

For example

$1/6$ of 300 is 50 because $1/3$ of 300 is 100, $1/2$ of 100 is 50.

Use factors

For example

15×6	$15 \times 3 = 45$	and	$45 \times 2 = 90$	so	$15 \times 6 = 90$.
$90 \div 6$	$90 \div 3 = 30$	and	$30 \div 2 = 15$	so	$90 \div 6 = 15$

WRITTEN METHODS FOR MULTIPLICATION

Partition and then multiply

Begin to multiply a two digit number by a single digit number, multiplying the tens first for example

$$\begin{aligned}47 \times 5 &= (40 \times 5) + (7 \times 5) \\ &= 200 + 35 \\ &= 235\end{aligned}$$

Grid Method

For example 72×38 is approximately $70 \times 40 = 2800$, this gives you an idea that your answer should be nearly this number.

X	70	2	
30	2100	60	$2100 + 60 = 2160$
8	560	16	$560 + 16 = 576$

Then add the amounts together

$$\begin{array}{r}2160 \\ + 576 \\ \hline 2736\end{array}$$

Short Multiplication

24×6 becomes

$$\begin{array}{r}24 \\ \times 6 \\ \hline 144 \\ \hline 2\end{array}$$

Answer: 144

342×7 becomes

$$\begin{array}{r}342 \\ \times 7 \\ \hline 2394 \\ \hline 21\end{array}$$

Answer: 2394

2741×6 becomes

$$\begin{array}{r}2741 \\ \times 6 \\ \hline 16446 \\ \hline 42\end{array}$$

Answer: 16 446

Long Multiplication

24×16 becomes

$$\begin{array}{r}24 \\ \times 16 \\ \hline 240 \\ 144 \\ \hline 384\end{array}$$

Answer: 384

124×26 becomes

$$\begin{array}{r}124 \\ \times 26 \\ \hline 2480 \\ 744 \\ \hline 3224 \\ \hline 11\end{array}$$

Answer: 3224

124×26 becomes

$$\begin{array}{r}124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ \hline 11\end{array}$$

Answer: 3224

DECIMALS

When multiplying decimals choose one of the methods above. Remind children that the decimal points should line up under each other.

WRITTEN METHODS FOR DIVISION

Long Division

432 ÷ 15 becomes

$$\begin{array}{r} 28 \text{ r } 12 \\ 15 \overline{) 432} \\ \underline{300} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

Answer: 28 remainder 12

432 ÷ 15 becomes

$$\begin{array}{r} 28 \\ 15 \overline{) 432} \\ \underline{300} \\ 132 \\ \underline{120} \\ 12 \end{array} \begin{array}{l} 15 \times 20 \\ 15 \times 8 \end{array}$$

$$\frac{12}{15} = \frac{4}{5}$$

Answer: $28 \frac{4}{5}$

432 ÷ 15 becomes

$$\begin{array}{r} 28.8 \\ 15 \overline{) 432.0} \\ \underline{300} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Answer: 28.8

Short Division

98 ÷ 7 becomes

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{70} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{400} \\ 32 \\ \underline{30} \\ 2 \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 45 \text{ r } 1 \\ 11 \overline{) 496} \\ \underline{440} \\ 56 \\ \underline{55} \\ 1 \end{array}$$

Answer: $45 \frac{1}{11}$

Order of the four operations

When you see more than one operation in a calculation, there is a standard order you must use:

B- Brackets

I - Indices (this covers powers and roots)

D- Division

M-Multiplication

A- Addition

S- Subtraction

i.e $2 + 4 \times 5$ means $2 + 20 = 22$

NOT $6 \times 5 = 30$

Using brackets:

$$10 \div (23 - 21)$$

$$10 \div (2) = 5$$

$$2 \times (2 \times 2) \times 2 = 16$$

Encourage your child to jot down their workings out to show each step. The method used should be quick, accurate and show their jottings.

Give your child a number problem to solve. Talk through the question and ask your child to figure out which part or parts of the calculation is addition, subtraction, multiplication or division.