

Holy Trinity Church of England Primary School

To be the best we can be: for God, for others and for ourselves



Calculation Policy

Fractions

Subject leader: H DANIELS

Vision

Agreed by Governors

Autumn 2020

Due for review

Summer 2023

Vision

At Holy Trinity Church of England Primary School, every child is recognised as a unique individual. We celebrate and welcome differences within our diverse school community, encouraging all to grow and flourish as precious children of God. Learning is centred around experiencing the joy of discovery. The ability to learn is underpinned by the teaching of basic skills, knowledge, concepts and values, with a vision to prepare our children to be life-long learners, rooted in our school motto: To be the best we can be: For God, for others and for ourselves.

Christian Values

Love

Hope

Forgiveness

Trust

Peace

Reverence

Justice

At Holy Trinity Primary we believe that children should be introduced to the processes of calculation through practical, oral and mental activities. As pupils begin to understand the underlying ideas they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved.

Choosing the appropriate strategy, recording in mathematics and in calculation in particular is an important tool both for furthering the understanding of ideas and for communicating those ideas to others. A useful written method is one that helps children carry out a calculation and can be understood by others.

Written methods are complementary to mental methods and should not be seen as separate from them. The aim is that pupils 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. It is important

pupils acquire secure mental methods of calculation and one efficient written method of calculation for addition, subtraction, multiplication and division which they know they can rely on when mental methods are not appropriate.



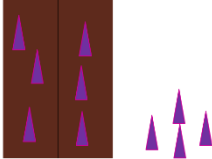








This document identifies progression in calculation strategies rather than specifying which method should be taught in a particular year group.

Children should not be made to go onto the next stage if:

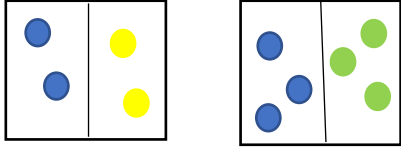



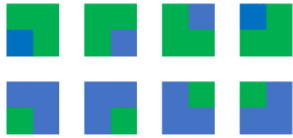
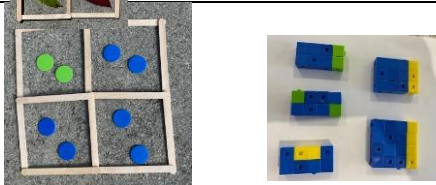
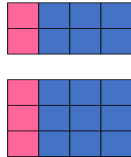
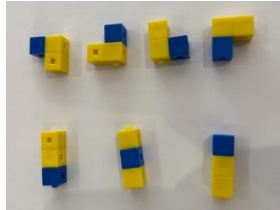
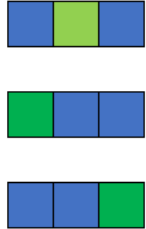
- 1) they are not ready.
- 2) they are not confident.

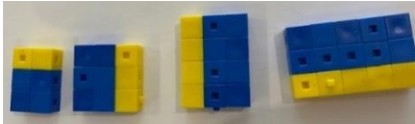
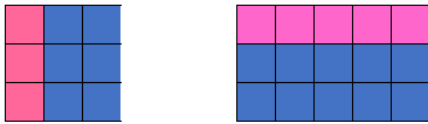

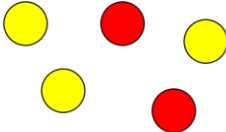


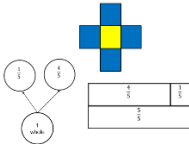
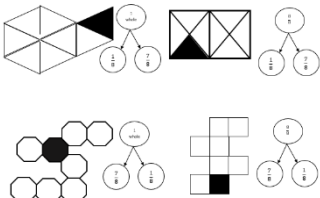
By the end of Year 6, children should be able to choose the most appropriate approach to solve a problem: making a choice between using jottings (an extended written method), an efficient written method or a mental method.

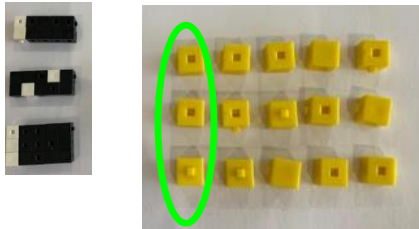
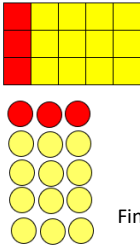

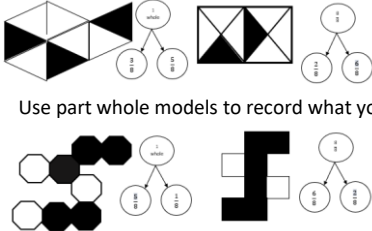
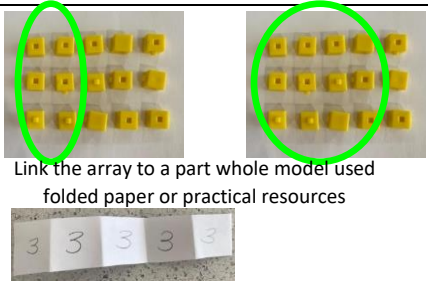
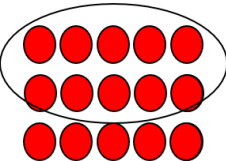
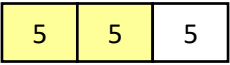
This policy contains the key pencil and paper procedures that will be taught within our school alongside practical resources. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement.


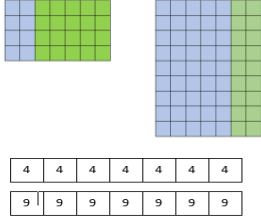
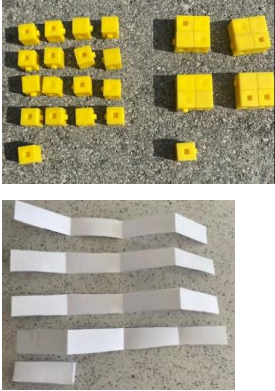
	Concrete	Pictorial	Abstract
EYFS			
To solve problems including halves	  <p>Halves of fruit or drinks and other common items</p>	 <p>Half and share images E.g. put half of the purple spikes on the Gruffalo</p>	
Key Stage 1			
To find $\frac{1}{2}$ of a shape	   <p>Find half using cubes or everyday items</p>	    	

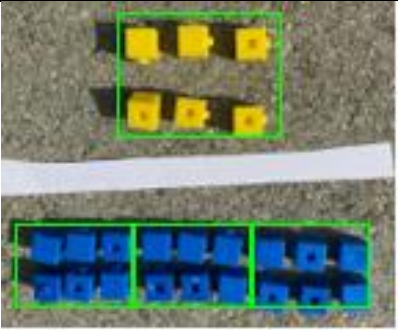
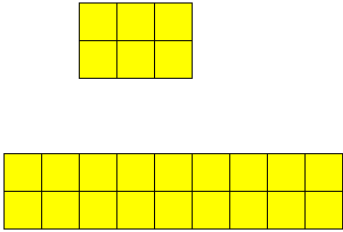


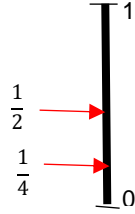
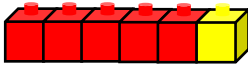
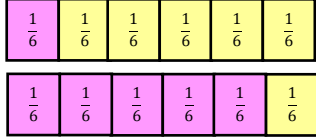
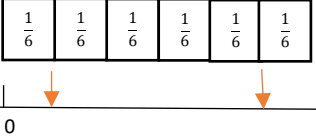

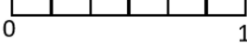
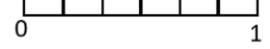
Find half of variety shapes in different ways

<p>To find $\frac{1}{2}$ of a number</p>	 <p>Find half using cubes or counters</p>	 <p>Find half using cubes or counters</p>	<p>$\frac{1}{2}$ of 8 = 4</p> <p>$\frac{1}{2}$ of 10 = 5</p>
<p>To find $\frac{1}{4}$ of a shape</p> <p>To find $\frac{3}{4}$ of a shape</p>	  <p>Find quarter using cubes or everyday items and show in different ways</p>	 <p>Find quarter using pictures and show in different ways</p>	
<p>To find $\frac{1}{4}$ of a number</p> <p>To find $\frac{3}{4}$ of a number</p>	 <p>Find quarter using cubes or everyday items and show in different ways</p>	 <p>Find quarter using pictures and show in different ways</p>	<p>$\frac{1}{4}$ of 8 = 2</p> <p>$\frac{1}{4}$ of 12 = 3</p> <p>Find quarter using abstract form</p>
<p>To find $\frac{1}{3}$ of a shape</p>	 <p>Find third using cubes or everyday items and show in different ways</p>	 <p>Find third using pictures and show in different ways</p>	

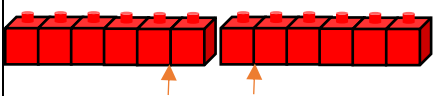
<p>To find $\frac{1}{3}$ of a number</p>	 <p>Find third using cubes and show in different ways</p>	 <p>Find third using pictures and show in different ways</p>	<p>$\frac{1}{3}$ of 9 = 3</p> <p>$\frac{1}{3}$ of 15 = 5</p>
<p>Key Stage 2</p>			
<p>Recognise, find, and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators</p>	 <p>What fraction are apples? Pears? Limes?</p>	<p>What fraction is red?</p>  <p>What fraction are square? Circles?</p> 	<p>What fraction are multiples of 3?</p> <div> <div>27</div> <div>13</div> <div>23</div> <div>9</div> <div>21</div> </div>
<p>Find unitary fractions of shapes</p>	 <p>Find unitary fractions using cubes or everyday items and show in different</p> 	 <p>Find unitary fractions using pictures and show in different way</p>	

Find unitary fractions of numbers	 <p>Find unitary fractions using cubes</p>	<p>$\frac{1}{5}$ of 15</p>  <p>Find unitary fractions using pictures</p>	$\frac{1}{5}$ of 25 $\frac{1}{9}$ of 27 $\frac{1}{6}$ of 18
Find Non-unitary fractions of shapes	 <p>Use part whole models to record what you see</p>	 <p>Use part whole models to record what you see</p>	
Find Non-unitary fractions of numbers	 <p>Link the array to a part whole model used folded paper or practical resources</p>	 <p>Link the array to a part whole model</p> 	$\frac{2}{3}$ of 15 $\frac{3}{5}$ of 25

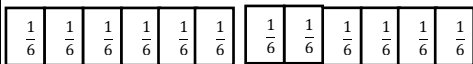
<p>Find increasingly difficult non unitary fractions</p>	<p>Find $\frac{3}{7}$ OF 42 and $\frac{5}{6}$ of 42 Compare fraction of same number</p> 	<p>Find $\frac{2}{7}$ of 28 and $\frac{5}{7}$ of 63 Compare fractions using same denominator</p> 	<p>Compare fractions</p> <div> $\frac{3}{7}$ of 49 <input type="text"/> $\frac{8}{28}$ × 21 </div> <div> $\frac{2}{5}$ of 45 <input type="text"/> $\frac{3}{5}$ × 30 </div> <div> $\frac{3}{8}$ of 72 <input type="text"/> $\frac{18}{24}$ × 32 </div> <div> $\frac{1}{6}$ of 24 <input type="text"/> $\frac{12}{18}$ × 36 </div>
<p>Recognise mixed numbers and improper fractions</p>	 <div> $\frac{17}{4}$ </div>	<div> <div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div> </div> <div> <div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div> </div> <div> <div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div> </div> <div> <div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div><div><input type="text"/></div> </div> <div> <div><input type="text"/></div> </div>	<div> $\frac{17}{4} = 4\frac{1}{4}$ </div>

<p>Use common factors to simplify fractions</p>			<p>$\frac{6}{18}$</p> <p>Find largest common factor of 6 and simplify to $\frac{1}{3}$</p>
<p>Compare and Order fractions</p>			
<p>Compare and order unit fractions</p>			
<p>Compare and order fractions of the same denominator</p>	<p>Compare $\frac{1}{6}$ and $\frac{5}{6}$</p> 	<p>Compare $\frac{1}{6}$ and $\frac{5}{6}$</p> 	<p>Compare $\frac{1}{6}$ and $\frac{5}{6}$</p> 
		  <p>Show both fractions ($\frac{1}{6}$ and $\frac{5}{6}$) on the number line</p>	

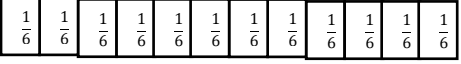
Compare and order fractions of the same denominator



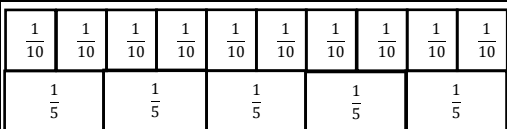
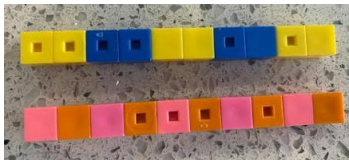
Compare $\frac{5}{6}$ and $\frac{7}{6}$



Compare $\frac{5}{6}$ and $\frac{7}{6}$



Compare and order fractions of the whose denominators are all multiples of the same number

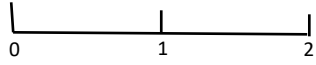


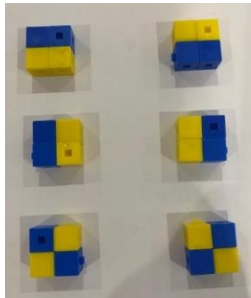
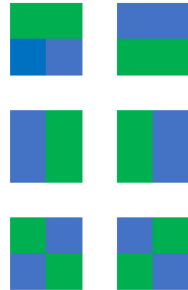
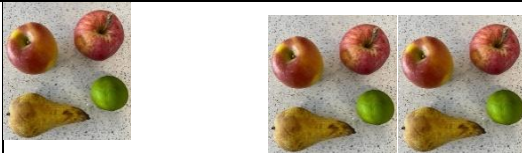

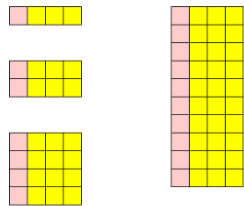
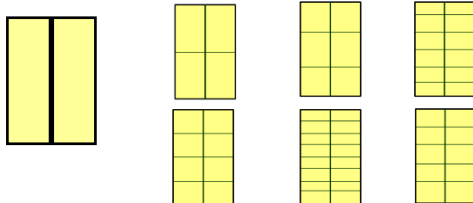
Compare and order fractions including fractions > 1

Compare $\frac{6}{8}$ and $\frac{7}{9}$

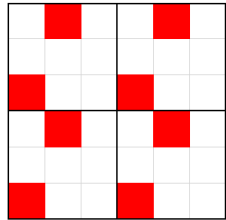


Compare $\frac{11}{9}$ and $\frac{13}{8}$

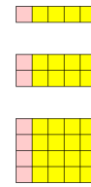


Equivalent Fractions																			
<p>Recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$</p>			$\frac{2}{4}$ and $\frac{1}{2}$																
<p>Recognise and show, using diagrams, families of common equivalent fractions with small denominators</p>																			
	 <p>family of $\frac{1}{4}$ and $\frac{3}{4}$</p>	 <p>Find a fraction of a shape and cut into equal groups in different ways</p>	<table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>5</td><td>10</td><td>15</td><td>20</td><td>25</td><td>30</td><td>35</td><td>40</td></tr></table> <p>Use double number line</p>	1	2	3	4	5	6	7	8	5	10	15	20	25	30	35	40
1	2	3	4	5	6	7	8												
5	10	15	20	25	30	35	40												

**Recognise and show,
using diagrams,
families of common
equivalent fractions**



$$\frac{2}{9} = \frac{4}{18} = \frac{6}{27} = \frac{8}{36}$$



Family of $\frac{1}{5}$ and $\frac{4}{5}$



Family of $\frac{2}{3}$ and $\frac{1}{3}$

1	2	3	4	5	6	7	8
2	4	6	8	10	12	14	16
3	6	9	12	15	18	21	24
4	8	12	16	20	24	28	32
5	10	15	20	25	30	35	40
6	12	18	24	30	36	42	48
7	14	21	28	35	42	49	56
8	16	24	32	40	48	56	64

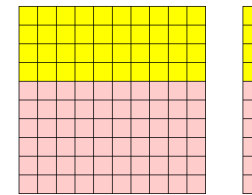
Use multiplication table

**Identify name and
write equivalent
fractions of a given
fraction, represented
visually, including
tenths and
hundredths**



$$\frac{12}{36} = \frac{1}{3}$$

$$\frac{24}{36} = \frac{2}{3}$$



$$\frac{40}{100} = \frac{4}{10} = \frac{2}{5}$$

Write fractions that are equivalent to $\frac{3}{5}$

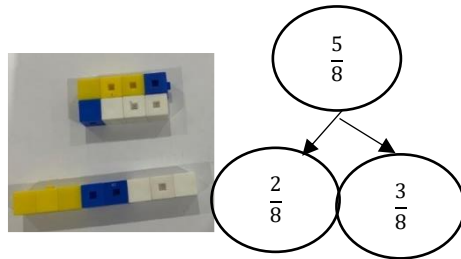
$$\frac{30}{50} \quad \frac{60}{100} \quad \frac{120}{200}$$

$$\frac{15}{25} \quad \frac{21}{35} \quad \frac{27}{45}$$

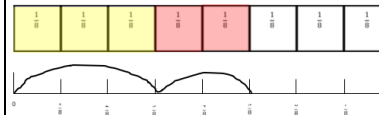
Calculation

Addition and Subtraction of fractions

Add and subtract fractions with the same denominator within one whole



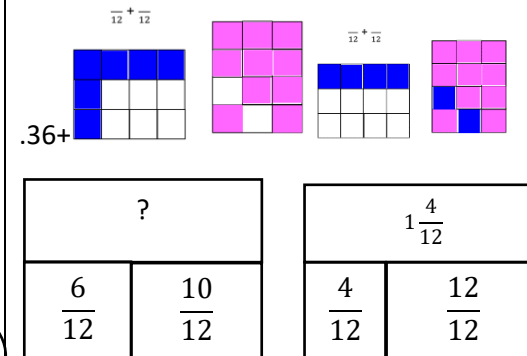
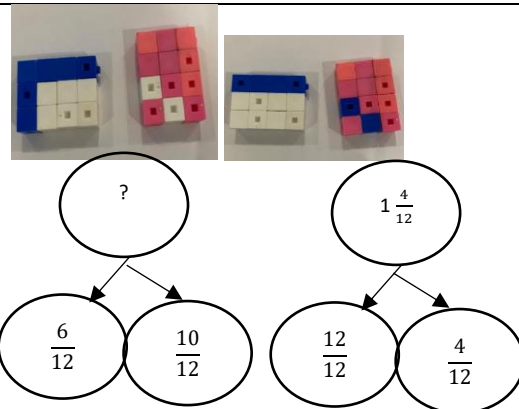
$$\frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$



$$\frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$

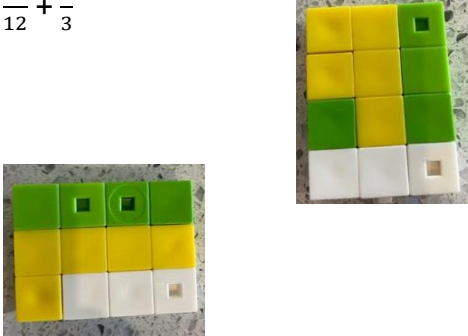
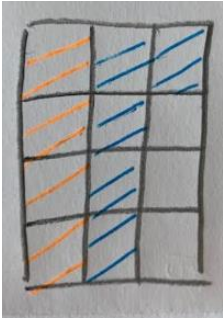
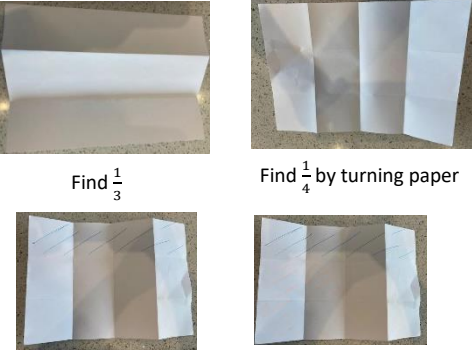
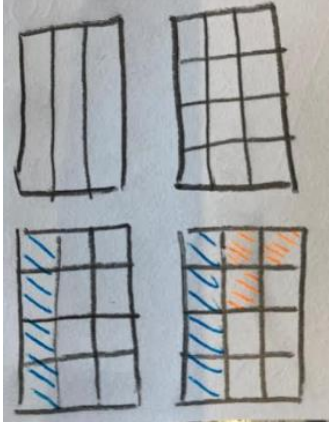
$$\frac{2}{8} + \frac{3}{8} + \frac{3}{8} = \frac{8}{8}$$

Add and subtract fractions with the same denominator



$$\frac{6}{12} + \frac{10}{12} = 1\frac{4}{12}$$

$$1\frac{4}{12} = 1\frac{1}{3}$$

<p>Add and subtract fractions with denominators that are multiples of the same number</p>	$\frac{5}{12} + \frac{1}{3}$  <p>(This a remodel to show $\frac{3}{4}$)</p>	$\frac{5}{12} + \frac{1}{3}$ 	$\frac{5}{12} + \frac{1}{3} = \frac{3}{4}$
<p>Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions</p>	$\frac{1}{3} + \frac{1}{4}$  <p>Find $\frac{1}{3}$</p> <p>Find $\frac{1}{4}$ by turning paper</p> <p>Show $\frac{1}{3}$</p> <p>Show $\frac{1}{4}$</p>		$\frac{1}{3} + \frac{1}{4}$ $\frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

$$\text{Answer} = \frac{7}{12}$$

Calculation

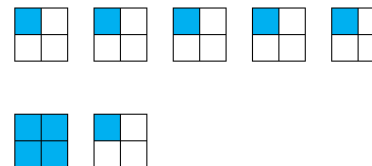
Multiplication and division

Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

$$\frac{1}{4} \times 5$$



$$\frac{1}{4} \times 5$$



$$\frac{1}{4} \times 5$$

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{5}{4}$$

$$\frac{5}{4} = 1\frac{1}{4}$$

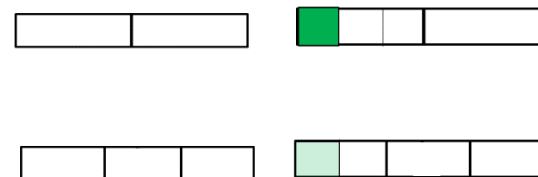
Multiply pairs of proper fractions, writing the answer in its simplest form

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




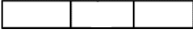
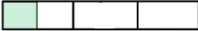




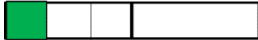
$$\frac{1}{3} \text{ of } \frac{1}{2} \quad \frac{1}{2} \text{ of } \frac{1}{3}$$



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



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

<div> <div>Divide proper fractions by whole numbers</div> </div>	<div> $\frac{1}{3} \div 2$    </div>	<div> $\frac{1}{3} \div 2$   </div>	<div> <div> $\frac{1}{3} \div 2$ $\frac{1}{3} \div \frac{2}{1}$ $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$ </div> </div>
	<div> $\frac{1}{2} \div 3$    </div>	<div> $\frac{1}{2} \div 3$   </div>	