

# MATHEMATICS

## Calculation Policy



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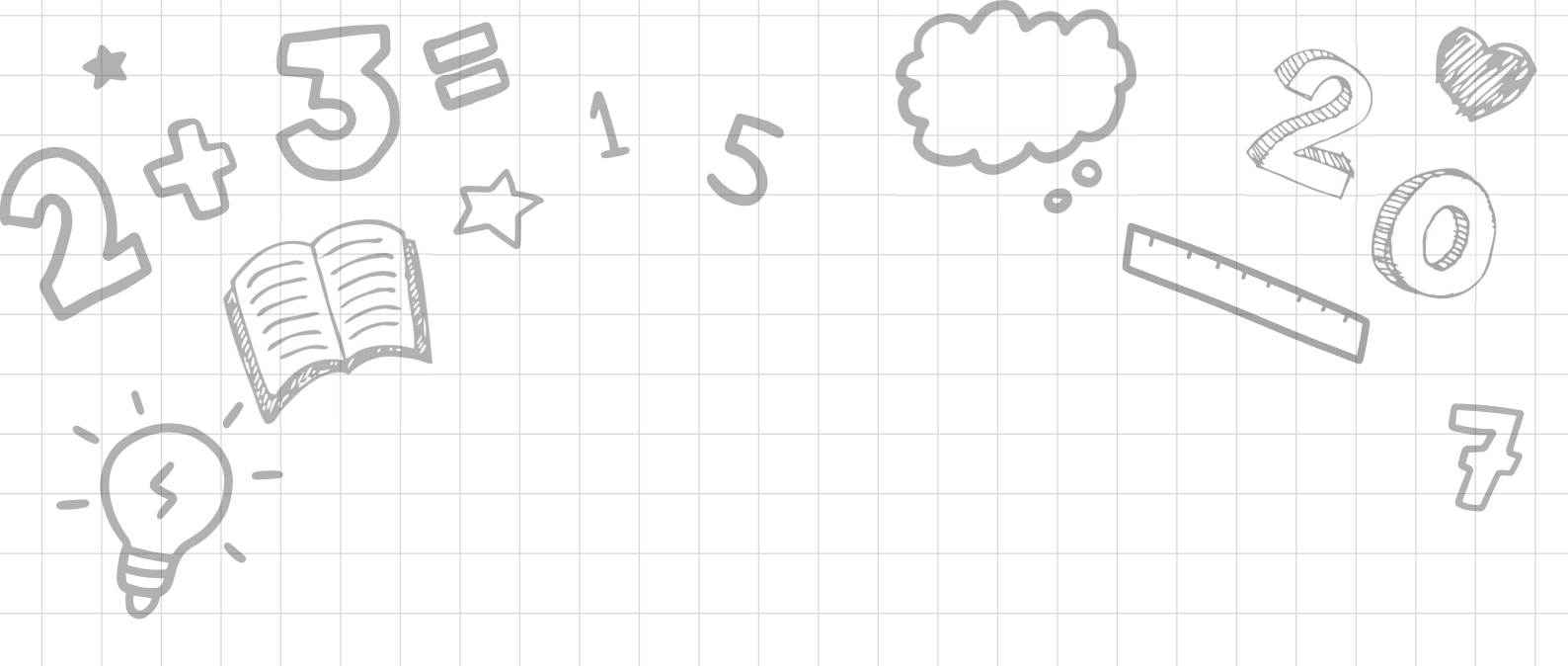
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# ADDITION



Step 1

Step 2

## Adding a two-digit and one-digit number - no exchange

**Step 1** Set it out

	T	O
	1	7
+		2

1 7 + 2 =

**Step 2** Add the ones

	T	O
	1	7
+		2
		9

**Step 3** Add the tens

	T	O
	1	7
+		2
	1	9

## Adding a two-digit and one-digit number - bridging 10

**Step 1** Set it out

T	O
1	7
+	6

1 7 + 6 =

**Step 2** Add the ones

T	O
1	7
+	6
	3
1	

**Step 3** Add the tens

T	O
1	7
+	6
2	3
<del>1</del>	

## Add two two-digit numbers - no exchange

**Step 1** Set it out

	T	O
	2	5
+	3	1
	-----	

2	5	+	3	1	=
---	---	---	---	---	---

**Step 2** Add the ones

	T	O
	2	5
+	3	1
	-----	6

**Step 3** Add the tens

	T	O
	2	5
+	3	1
	-----	
	5	6



Add two two-digit numbers  
- with exchange

Step 1

Set it out

	T	O	
	2	5	
+	3	6	
<hr/>			
2	5	+	3 6 =

Step 2

Add the ones

	T	O
	2	5
+	3	6
		1
	1	

Exchange the ones.  
11 ones = 1 ten 1 one.

Step 3

Add the tens

	T	O
	2	5
+	3	6
	6	1
	<del>1</del>	

Remember to add  
the exchanged ten.

Adding a three-digit number and ones  
- no exchange

Step 1 Set it out

H	T	O
3	5	1
+		6

3	5	1	+	6	=
---	---	---	---	---	---

Step 2 Add the ones

H	T	O
3	5	1
+		6
		7

Step 3 Add the tens

H	T	O
3	5	1
+		6
5		7

Step 4 Add the hundreds

H	T	O
3	5	1
+		6
3	5	7

## Adding a three-digit number and ones - exchange

**Step 1**

Set it out

	H	T	O
	3	5	1
+			9

3 5 1 + 9 =

**Step 2**

Add the ones

	H	T	O
	3	5	1
+			9
			0
	1		

Exchange to the tens column.

**Step 3**

Add the tens

	H	T	O
	3	5	1
+			9
		6	0
		<del>1</del>	

Remember to add the exchanged ten.

**Step 4**

Add the hundreds

	H	T	O
	3	5	1
+			6
	3	6	0
		<del>1</del>	

## Adding a two and three-digit number together - no exchange

**Step 1** Set it out

H	T	O
5	2	7
+	4	2

5 2 7 + 4 2 =

**Step 2** Add the ones

H	T	O
5	2	7
+	4	2
		9

**Step 3** Add the tens

H	T	O
5	2	7
+	4	2
6		9

**Step 4** Add the hundreds

H	T	O
5	2	7
+	4	2
5	6	9

## Adding a two and three-digit number together

Exchange - one exchange then multiple exchanges

**Step 1**

Set it out

	H	T	O
	5	7	6
+		4	8
<hr/>			
5	7	6	+ 4 8 =

**Step 2**

Add the ones

	H	T	O
	5	7	6
+		4	8
<hr/>			
			4
	1		

Exchange the ones.

**Step 3**

Add the tens

	H	T	O
	5	7	6
+		4	8
<hr/>			
		2	4
	1	<del>7</del>	

Don't forget to add the exchanged ten  
Exchange to hundreds if necessary.

**Step 4**

Add the hundreds

	H	T	O
	5	7	6
+		4	8
<hr/>			
	6	2	4
	<del>5</del>	<del>7</del>	

Remember to add the exchanged hundred.

Adding two three-digit numbers  
- no exchange

Step 1

Set it out

$$4 \quad 3 \quad 2 \quad + \quad 2 \quad 5 \quad 5 \quad =$$

	H	T	O
	4	3	2
+	2	5	5

Step 2

Add the ones

	H	T	O
	4	3	2
+	2	5	5
			7

Step 3

Add the tens

	H	T	O
	4	3	2
+	2	5	5
		8	7

Step 4

Add the hundreds

	H	T	O
	4	3	2
+	2	5	5
	6	8	7

Adding two three-digit numbers  
- one exchange

Step 1

Set it out

	H	T	O
	4	3	2
+	4	3	9

4 3 2 + 4 3 9 =

Step 2

Add the ones

	H	T	O
	4	3	2
+	4	3	9
			1
		1	

Exchange the ones.  
11 ones = 1 ten 1 one.

Step 3

Add the tens

	H	T	O
	4	3	2
+	4	3	9
		7	1
		<del>3</del>	

Remember to add  
the exchanged ten.

Step 4

Add the hundreds

	H	T	O
	4	3	2
+	4	3	9
	8	7	1
		<del>3</del>	

## Adding two three-digit numbers - multiple exchanges

**Step 1**

Set it out

	H	T	O
	3	5	8
+	2	6	3

3 5 8 + 2 6 3 =

**Step 2**

Add the ones

	H	T	O
	3	5	8
+	2	6	3
			11
		1	

Exchange the ones.  
11 ones = 1 ten 1 one.

**Step 3**

Add the tens

	H	T	O
	3	5	8
+	2	6	3
		12	1
	1	<del>2</del>	

Add the exchanged ten.  
Exchange the tens for hundreds.  
12 tens = 1 hundred 2 tens.

**Step 4**

Add the hundreds

	H	T	O
	3	5	8
+	2	6	3
	6	2	1
	<del>1</del>	<del>2</del>	

Add the exchanged hundred.



## Adding two four-digit numbers - no exchanges

**Step 1**

Set it out

TH	H	T	O
7	2	3	2
+	2	1	4

7 2 3 2 + 2 1 4 4 =

**Step 2**

Add the ones, tens, hundreds and thousands

T	H	T	O
7	2	3	2
+	2	1	4
9	3	7	6

Remember to start with the ones!

## Adding two four-digit numbers - exchange

**Step 1**

Set it out

TH	H	T	O
6	4	8	7
+	2	5	3

6 4 8 7 + 2 5 3 6 =

**Step 2**

Add the ones, tens, hundreds and thousands

TH	H	T	O
6	4	8	7
+	2	5	3
9	0	2	3
<del>1</del>	<del>1</del>	<del>1</del>	

Remember to start with ones!

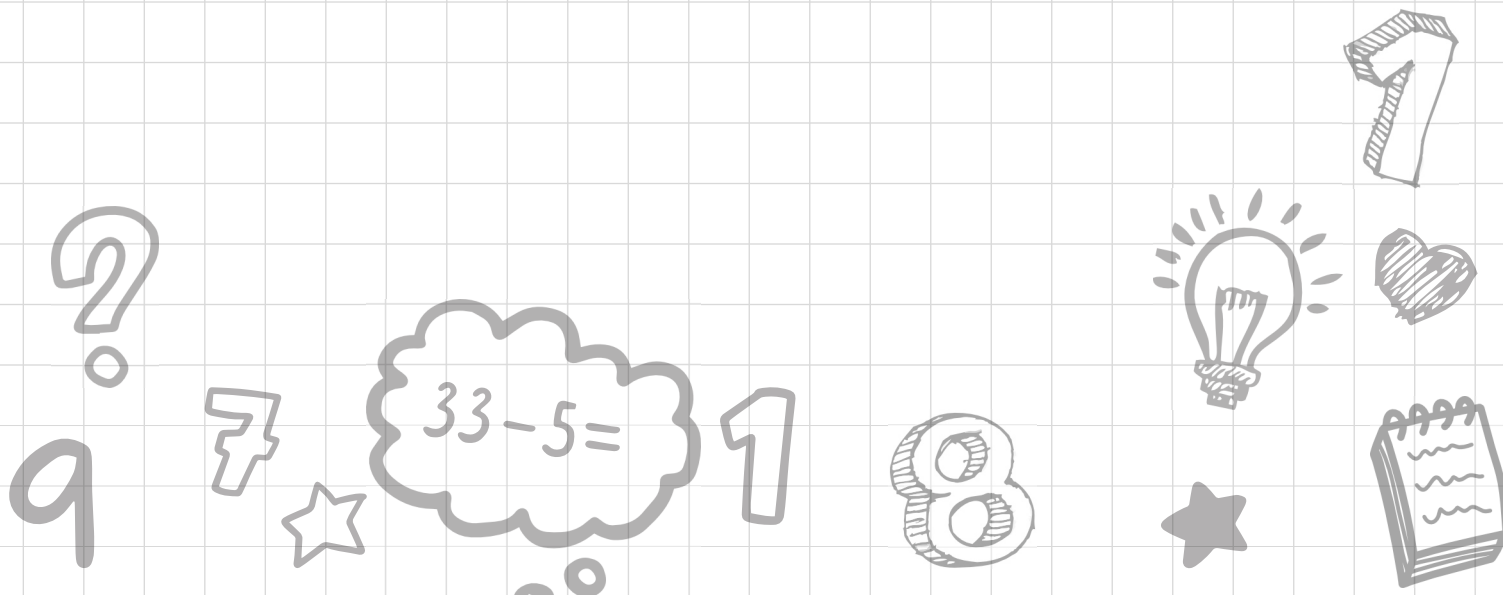
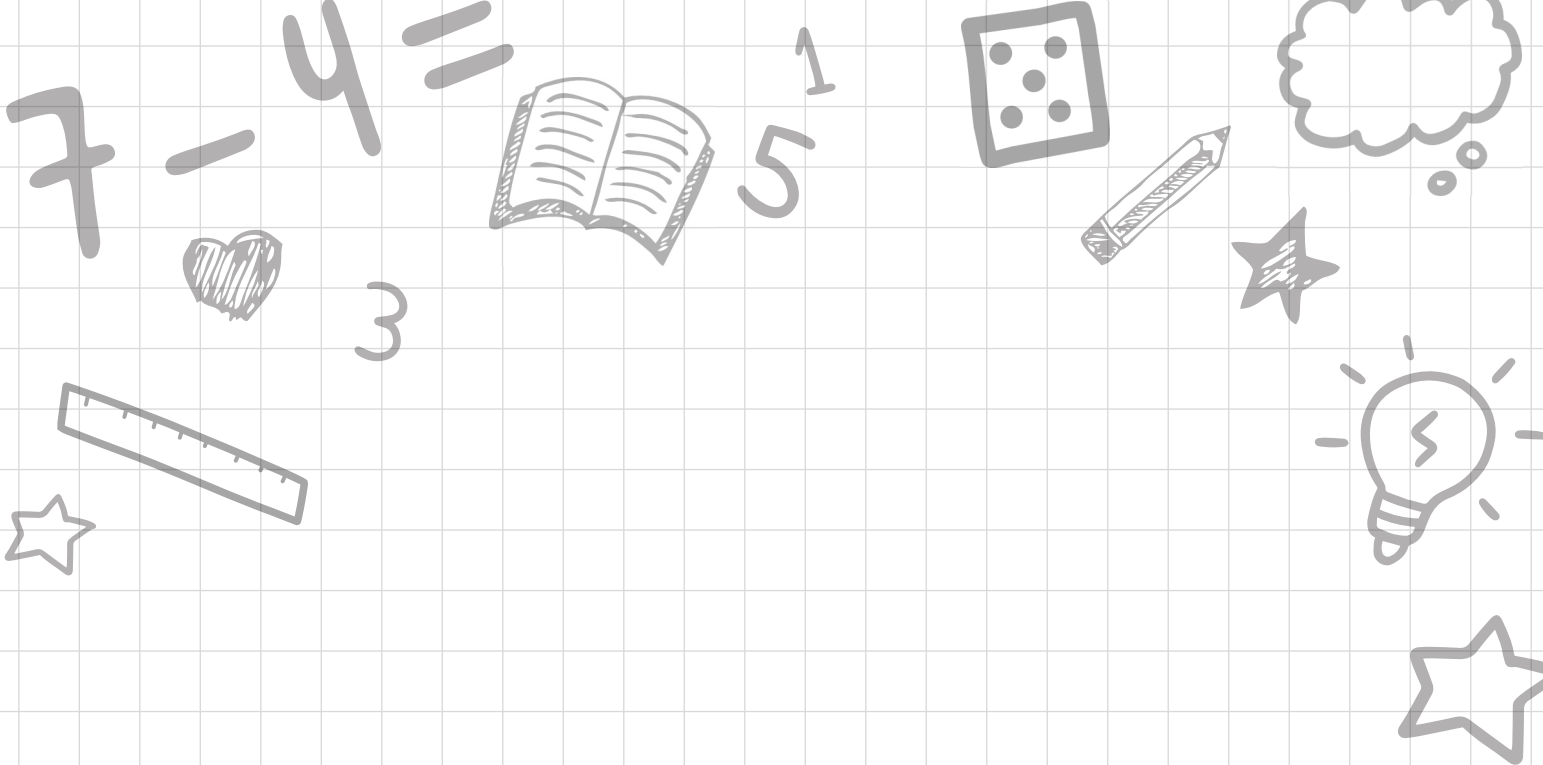
Don't forget to add the exchanged digits.

Repeat Steps for Y4

using numbers with more than four-digits.

+ use rounding to estimate final answer.

# SUBTRACTION



Step 1

Step 2

## Subtracting a one-digit number from a two-digit number - no exchange

**Step 1** Set it out

T	O	
4	8	
-		6

4	8	-	6	=
---	---	---	---	---

**Step 2** Subtract the ones

T	O	
4	8	
-		6
	2	

**Step 3** Subtract the tens

T	O	
4	8	
-		6
4	2	

## Subtracting a one-digit number from a two-digit number - exchanges

Step 1	Set it out	<table border="1"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td></td><td>4</td><td>4</td></tr> <tr><td></td><td>-</td><td>8</td></tr> <tr><td>4</td><td>4</td><td>- 8 =</td></tr> </table>		T	O		4	4		-	8	4	4	- 8 =
	T	O												
	4	4												
	-	8												
4	4	- 8 =												
Step 2	Exchange the tens	<table border="1"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td>3</td><td><del>4</del></td><td><sup>1</sup>4</td></tr> <tr><td></td><td>-</td><td>8</td></tr> </table>		T	O	3	<del>4</del>	<sup>1</sup> 4		-	8			
	T	O												
3	<del>4</del>	<sup>1</sup> 4												
	-	8												
Step 3	Subtract the ones	<table border="1"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td>3</td><td><del>4</del></td><td><sup>1</sup>4</td></tr> <tr><td></td><td>-</td><td>8</td></tr> <tr><td></td><td></td><td>6</td></tr> </table>		T	O	3	<del>4</del>	<sup>1</sup> 4		-	8			6
	T	O												
3	<del>4</del>	<sup>1</sup> 4												
	-	8												
		6												
Step 4	Subtract the tens	<table border="1"> <tr><td></td><td>T</td><td>O</td></tr> <tr><td>3</td><td><del>4</del></td><td><sup>1</sup>4</td></tr> <tr><td></td><td>-</td><td>8</td></tr> <tr><td>3</td><td></td><td>6</td></tr> </table>		T	O	3	<del>4</del>	<sup>1</sup> 4		-	8	3		6
	T	O												
3	<del>4</del>	<sup>1</sup> 4												
	-	8												
3		6												

## Subtracting a two-digit number from a two-digit number - no exchange

**Step 1** Set it out

T	O
4	5
-	2 1
-----	

4	5	-	2	1	=
---	---	---	---	---	---

**Step 2** Subtract the ones

T	O
4	5
-	2 1
-----	
	4

**Step 3** Subtract the tens

T	O
4	5
-	2 1
-----	
2	4

## Subtracting a two-digit number from a two-digit number - exchanges

**Step 1** Set it out

T	O	
6	3	
-	2	5
-----		

6 3 - 2 5 =

**Step 2** Exchange a ten

T	O	
5	1	
<del>6</del>	3	
-	2	5
-----		

**Step 3** Subtract the ones

T	O	
5	1	
<del>6</del>	3	
-	2	5
-----		
		8

**Step 4** Subtract the tens

T	O	
5	1	
<del>6</del>	3	
-	2	5
-----		
3		8



## Column subtraction - three-digit by three-digit - no exchange

**Step 1** Set it out

H	T	O
3	2	5
-	1	1 2

3	2	5	-	1	1	2	=
---	---	---	---	---	---	---	---

**Step 2** Subtract the ones

H	T	O
3	2	5
-	1	1 2
		3

**Step 3** Subtract the tens

H	T	O
3	2	5
-	1	1 2
		1 3

**Step 4** Subtract the hundreds

H	T	O
3	2	5
-	1	1 2
2	1	3

## Column subtraction - three-digit by three-digit - exchange from a ten or exchange from a hundred

### Step 1

Set it out

$$742 - 216 =$$

H	T	O
7	4	2
-	2	1
		6

$$818 - 234 =$$

H	T	O
8	1	8
-	2	3
		4

Exchange the ten

H	T	O
7	<del>4</del> <sup>3</sup>	<sup>1</sup> 2
-	2	1
		6

### Step 2

Subtract the ones

H	T	O
8	1	8
-	2	3
		4
		4

Subtract the ones

H	T	O
7	<del>4</del> <sup>3</sup>	<sup>1</sup> 2
-	2	1
		6
		6

### Step 3

Exchange the hundreds

H	T	O
<del>7</del> <sup>7</sup>	<del>1</del> <sup>1</sup>	8
-	2	3
		4
		4

### Step 4

Complete the calculation

H	T	O
7	<del>4</del> <sup>3</sup>	<sup>1</sup> 2
-	2	1
		6
5	2	6

H	T	O
<del>7</del> <sup>7</sup>	<del>1</del> <sup>1</sup>	8
-	2	3
		4
5	8	4



## Column subtraction - three-digit by three-digit - multiple exchanges with zero

**Step 1** Set it out

H	T	O
3	0	0
-	1	2
3	0	0
-	1	2
7	=	

**Step 2** Exchange from the hundred, then from the ten

H	T	O
<sup>2</sup> <del>3</del>	<sup>9</sup> <del>0</del>	<sup>1</sup> 0
-	1	2
1	7	3

**Step 3** Subtract ones, then tens, then hundreds

H	T	O
<sup>2</sup> <del>3</del>	<sup>9</sup> <del>0</del>	<sup>1</sup> 0
-	1	2
1	7	3

Column subtraction - four-digit by four-digit  
- no exchange**Step 1** Set it out

	TH	H	T	O					
	2	5	7	5					
-	1	3	6	2					
<hr/>									
2	5	7	5	-	1	3	6	2	=

**Step 2** Subtract the ones, tens, hundreds and thousands

	TH	H	T	O
	2	5	7	5
-	1	3	6	2
<hr/>				
	1	2	1	3

Start at the right

## Column subtraction - four-digit by four-digit - one exchange

Step 1

Set it out

TH	H	T	O
2	3	2	3
-			
1	1	7	1
-----			

$$2323 - 1171 =$$

Step 2

Subtract the ones

TH	H	T	O
2	3	2	3
-			
1	1	7	1
-----			
			2

Step 3

Exchange from the hundreds

TH	H	T	O
2	<del>3</del> <sup>2</sup>	<del>2</del> <sup>1</sup>	3
-			
1	1	7	1
-----			
			2

Step 4

Subtract the tens

TH	H	T	O
2	<del>3</del> <sup>2</sup>	<del>2</del> <sup>1</sup>	3
-			
1	1	7	1
-----			
		5	2

Step 5

Subtract the hundreds and thousands

TH	H	T	O
2	<del>3</del> <sup>2</sup>	<del>2</del> <sup>1</sup>	3
-			
1	1	7	1
-----			
1	1	5	2

*\*Practise with exchanges required in different columns\**

## Column subtraction - four-digit by four-digit - multiple exchanges

**Step 1**

Set it out

TH	H	T	O
4	3	6	2
-			
1	7	3	5

  
 $4362 - 1735 =$

**Step 2**

Exchange the tens

TH	H	T	O
4	3	<sup>5</sup> <del>6</del>	<sup>1</sup> 2
-			
1	7	3	5

**Step 3**

Subtract the ones and tens

TH	H	T	O
4	3	<sup>5</sup> <del>6</del>	<sup>1</sup> 2
-			
1	7	3	5
			27

**Step 4**

Exchange the thousands

TH	H	T	O
<sup>3</sup> <del>4</del>	<sup>1</sup> 3	<sup>5</sup> <del>6</del>	<sup>1</sup> 2
-			
1	7	3	5
			27

**Step 5**

Subtract the hundreds and thousands

TH	H	T	O
<sup>3</sup> <del>4</del>	<sup>1</sup> 3	<sup>5</sup> <del>6</del>	<sup>1</sup> 2
-			
1	7	3	5
2	6	2	7

## Column subtraction - four-digit by four-digit - multiple exchanges from zero

**Step 1**

Set it out

TH	H	T	O
4	0	0	0
-	3	2	8

$$4\ 0\ 0\ 0 - 3\ 2\ 8\ 4 =$$

**Step 2**

Exchange from the thousands to hundreds to tens to ones

TH	H	T	O
<sup>3</sup> 4	<sup>9</sup> 0	<sup>9</sup> 0	<sup>1</sup> 0
-	3	2	8

**Step 3**

Subtract the ones, then tens, then hundreds, then thousands

TH	H	T	O
<sup>3</sup> 4	<sup>9</sup> 0	<sup>9</sup> 0	<sup>1</sup> 0
-	3	2	8
0	7	1	6



Column subtraction - more than four-digits  
- no exchanges

Step 1

Set it out

	TTH	TH	H	T	O
	7	9	8	7	6
-	1	3	4	2	5

$$79876 - 13425 =$$

Step 2

Subtract ones, tens, hundreds, thousands then ten thousands

	TTH	TH	H	T	O
	7	9	8	7	6
-	1	3	4	2	5
	6	6	4	5	1

*\*Use teacher judgement to decide whether to break into further steps\**

Spot the exchange!



## Column subtraction - more than four-digits - one exchanges

**Step 1**

Set it out

TTH	TH	H	T	O
6	5	2	4	1
-	3	2	7	1

$$6 \ 5 \ 2 \ 4 \ 1 \ - \ 3 \ 2 \ 7 \ 1 \ 1 \ =$$

**Step 2**

Subtract ones and tens

TTH	TH	H	T	O
6	5	2	4	1
-	3	2	7	1
			3	0

**Step 3**

Exchange from thousands

TTH	TH	H	T	O
6	<sup>4</sup> 5	<sup>1</sup> 2	4	1
-	3	2	7	1
			3	0

**Step 4**

Subtract hundreds, thousands, and ten thousands

TTH	TH	H	T	O
6	<sup>4</sup> 5	<sup>1</sup> 2	4	1
-	3	2	7	1
	3	2	5	3

*\*Use teacher judgement to decide whether to break into further steps\**

*\*Practise with exchanges required in different columns\**

Column subtraction - more than four-digits  
- multiple exchanges

Step 1

Set it out

	TTH	TH	H	T	O
	7	2	3	4	6
-	1	8	4	5	2

7 2 3 4 6 - 1 8 4 5 2 =

Step 2

Subtract from right to left starting with ones. Exchanging where necessary.

	TTH	TH	H	T	O
	<sup>6</sup> <del>7</del>	<sup>11</sup> <del>2</del>	<sup>12</sup> <del>3</del>	<sup>1</sup> 4	6
-	1	8	4	5	2
	5	3	8	9	4

*\*Use teacher judgement to decide whether to break into further steps\**

Column subtraction - more than four-digits  
- multiple exchanges with zeros

Step 1

Set it out

	TTH	TH	H	T	O
	7	0	0	0	0
-	2	5	6	3	2

7 0 0 0 0 - 2 5 6 3 2 =

Step 2

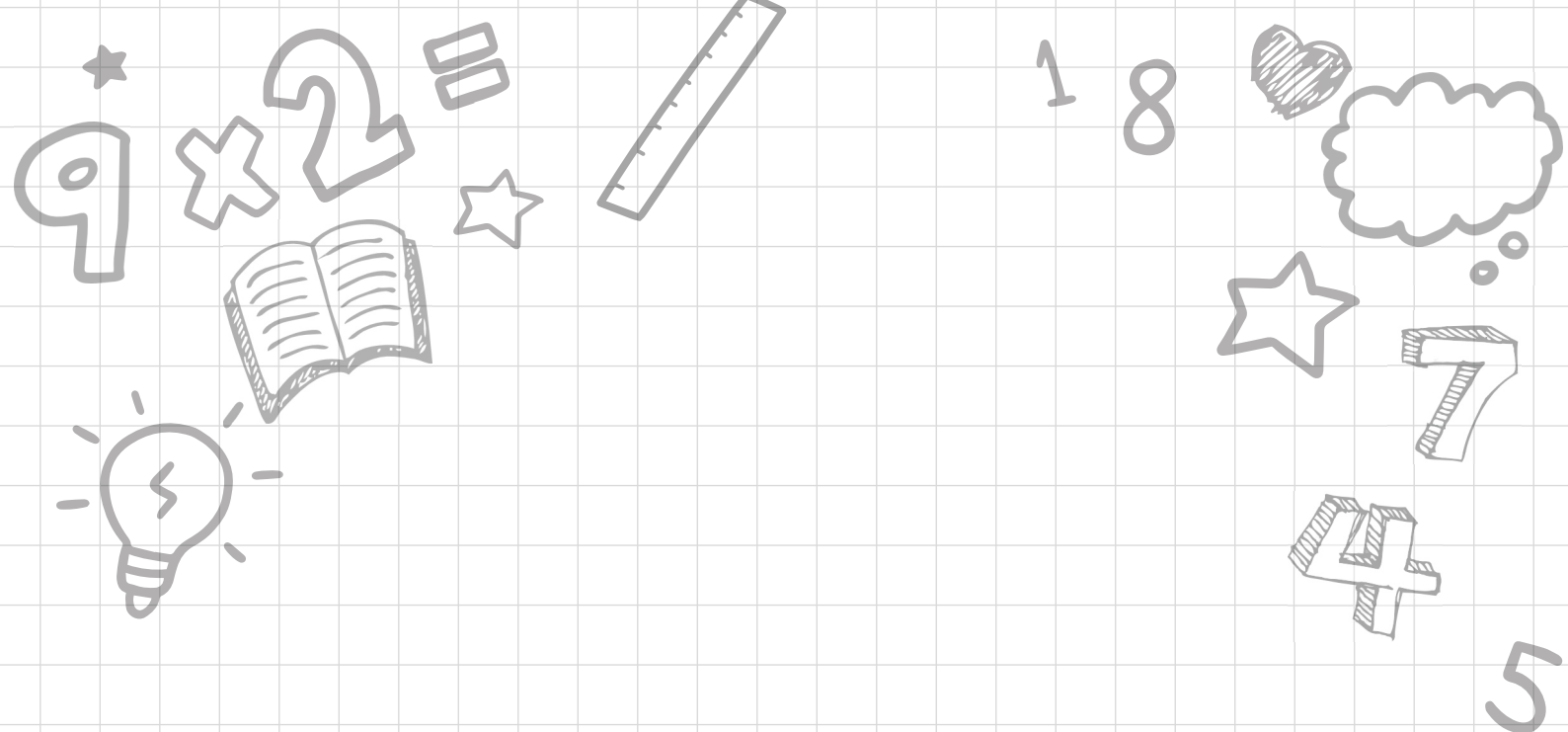
Exchange from ten thousands to thousands to hundreds to tens to ones

	TTH	TH	H	T	O
	<sup>6</sup> <del>7</del>	<sup>9</sup> <del>0</del>	<sup>9</sup> <del>0</del>	<sup>9</sup> <del>0</del>	<sup>1</sup> 0
-	2	5	6	3	2

Step 3

Subtract ones then tens then hundreds then thousands then ten thousands

	TTH	TH	H	T	O
	<sup>6</sup> <del>7</del>	<sup>9</sup> <del>0</del>	<sup>9</sup> <del>0</del>	<sup>9</sup> <del>0</del>	<sup>1</sup> 0
-	2	5	6	3	2
	4	4	3	6	8



# MULTIPLICATION



Step 1

Step 2

Step 1

Step 2

Step 1

Step 2



Step 1

Step 2

## Two-digit by one-digit - no exchanging

<b>Step 1</b>	Set it out	<table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td style="text-align: center;">T</td><td style="text-align: center;">O</td></tr> <tr><td></td><td style="text-align: center;">2</td><td style="text-align: center;">3</td></tr> <tr><td></td><td style="text-align: center;">x</td><td style="text-align: center;">3</td></tr> <tr><td colspan="3" style="border-top: 1px solid black;"></td></tr> </table>		T	O		2	3		x	3			
	T	O												
	2	3												
	x	3												
	2 3 x 3 =													

<b>Step 2</b>	Multiplying the ones	<table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td style="text-align: center;">T</td><td style="text-align: center;">O</td></tr> <tr><td></td><td style="text-align: center;">2</td><td style="text-align: center;">3</td></tr> <tr><td></td><td style="text-align: center;">x</td><td style="text-align: center;">3</td></tr> <tr><td colspan="3" style="border-top: 1px solid black;"></td></tr> <tr><td></td><td></td><td style="text-align: center;">9</td></tr> </table>		T	O		2	3		x	3						9
	T	O															
	2	3															
	x	3															
		9															

<b>Step 3</b>	Multiply the tens by the ones	<table style="margin-left: auto; margin-right: auto;"> <tr><td></td><td style="text-align: center;">T</td><td style="text-align: center;">O</td></tr> <tr><td></td><td style="text-align: center;">2</td><td style="text-align: center;">3</td></tr> <tr><td></td><td style="text-align: center;">x</td><td style="text-align: center;">3</td></tr> <tr><td colspan="3" style="border-top: 1px solid black;"></td></tr> <tr><td></td><td style="text-align: center;">6</td><td style="text-align: center;">9</td></tr> </table>		T	O		2	3		x	3					6	9
	T	O															
	2	3															
	x	3															
	6	9															

Two-digit by one-digit  
- exchanging

Step 1 Set it out

	T	O	
	2	3	
x	5		
	2	3	

2	3	x	5	=
---	---	---	---	---

Step 2 Multiply the ones

	T	O	
	2	3	
x	5		
	1	5	

Exchange the ones for a ten.  
15 ones = 1 ten + 5 ones.

Step 3 Multiply the tens by the ones and add the exchanged ten

	T	O	
	2	3	
x	5		
1	1	5	

$2 \times 5 = 10 + 1 = 11$

## Three-digit by one-digit - no exchange

**Step 1**

Set it out

H	T	O
2	4	3
x		2

2	4	3	x	2	=
---	---	---	---	---	---

**Step 2**

Multiply the ones

H	T	O
2	4	3
x		2
		6

**Step 3**

Multiply the tens by the ones

H	T	O
2	4	3
x		2
8		6

**Step 4**

Multiply the hundreds by the ones

H	T	O
2	4	3
x		2
4	8	6

Three-digit by one-digit  
- exchanging

Step 1

Set it out

	H	T	O	
	2	4	3	
x			5	
<hr/>				
2	4	3	x	5 =

Step 2

Multiply the ones

	H	T	O	
	2	4	3	
x			5	
<hr/>				
			5	1

Exchange the ten to the side

Step 3

Multiply the tens and add on any exchanged tens

	H	T	O	
	2	4	3	
x			5	
<hr/>				
		1	5	2

Cross off the digit when added

Step 4

Multiply the hundreds and add on any exchanged hundreds

	H	T	O	
	2	4	3	
x			5	
<hr/>				
1	2	1	5	2

Cross off the digit when added

*\*Children will have practised three-digit by one-digit with a range of exchanges\**

## Four-digit by one-digit - exchanging

**Step 1** Set it out.

$$4\ 2\ 4\ 7 \times 4 =$$

	TH	H	T	O
	4	2	4	7
x				4

**Step 2** Multiply the ones.  
Exchange if answer is >9.

	TH	H	T	O
	4	2	4	7
x				4
				28

Exchange to the side

**Step 3** Multiply the tens.  
Add any tens that have been exchanged.  
Exchange to hundreds where necessary.

	TH	H	T	O
	4	2	4	7
x				4
			8	8

Exchange to the side and cross off when added

**Step 4** Multiply the hundreds.  
Add any hundreds that have been exchanged.  
Exchange to thousands where necessary.

	TH	H	T	O
	4	2	4	7
x				4
		9	8	8

**Step 5** Multiply the thousands.  
Add any thousands that have been exchanged.

	TH	H	T	O
	4	2	4	7
x				4
	1	6	9	8

## Long multiplication - two-digit by two-digit - no exchange

**Step 1**

Set it out

	T	O
	3	4
x	1	2
<hr/>		

$$34 \times 12 =$$

**Step 2**

Multiply the ones by the ones

	T	O
	3	4
x	1	2
<hr/>		
		8

**Step 3**

Multiply the tens by the ones

	T	O
	3	4
x	1	2
<hr/>		
	6	8

**Step 4**

Insert place holder

	T	O
	3	4
x	1	2
<hr/>		
	6	8
		0

Place Holder

**Step 5**

Multiply the tens by the ones

	T	O
	3	4
x	1	2
<hr/>		
	6	8
	4	0

**Step 6**

Multiply the tens by the tens

	T	O
	3	4
x	1	2
<hr/>		
	6	8
	3	4
		0

**Step 7**

Add the totals

	T	O
	3	4
x	1	2
<hr/>		
	6	8
		0
	3	4
		0
x	3	4
<hr/>		
	4	0
	8	
		0
	1	

## Long multiplication - two-digit by two-digit - exchange

**Step 1** Set it out

	T	O
	7	5
x	3	2
<hr/>		

7 5 x 3 2 =

**Step 2**

Multiply ones by ones

	T	O
	7	5
x	3	2
<hr/>		
		0

Exchange to the side

Ensure you exchange correctly

**Step 3**

Multiply ones by tens

	T	O
	7	5
x	3	2
<hr/>		
1	5	0

Cross off when added

Add the exchanged tens

**Step 4**

Insert place holder

	T	O
	7	5
x	3	2
<hr/>		
1	5	0
		0

Place Holder

**Step 5**

Multiply tens by ones

	T	O
	7	5
x	3	2
<hr/>		
1	5	0
	5	0

Exchange to the side

Ensure you exchange correctly

**Step 6**

Multiply tens by tens

	T	O	
	7	5	
x	3	2	
<hr/>			
1	5	0	
	5	0	
2	2	5	0

Cross off when added

Add the exchanged ten

**Step 7**

Add totals together

	T	O	
	7	5	
x	3	2	
<hr/>			
1	5	0	
	5	0	
2	2	5	0
<hr/>			
2	4	0	0
	1		



## Long multiplication - three-digit by two-digit - exchange

**Step 1**

Set it out

	H	T	O
	7	5	2
x		2	5

$$752 \times 25 =$$

*\*Teacher's choice whether to step 2-4 or complete as one*

**Step 2**

Multiply ones by ones

**Step 3**

Multiply the ones by tens.  
Add the exchanged digits and exchange

**Step 4**

Multiply the ones by hundreds.  
Add the exchanged digits

	H	T	O
	7	5	2
x		2	5
		0	1

Exchange

	H	T	O
	7	5	2
x		2	5
		6	0
			2

Cross off when added

	H	T	O
	7	5	2
x		2	5
	3	7	6
		0	2

**Step 5**

Insert place holder

**Step 6**

Multiply tens by ones,  
then tens, then hundreds

**Step 7**

Add totals together

	H	T	O
	7	5	2
x		2	5
	3	7	6
		0	2
			0

Place Holder

	H	T	O
	7	5	2
x		2	5
	3	7	6
		0	2
	1	5	0
		4	0

	H	T	O
	7	5	2
x		2	5
	3	7	6
		0	2
	1	5	0
		4	0
	1	8	8
		0	0
		1	

## Long multiplication - four-digit by two-digit

**Step 1**

Set it out

$$3\ 8\ 7\ 1\ \times\ 4\ 5 =$$

TH	H	T	O
3	8	7	1
		4	5

x

**Step 2**

Multiply all digits by the ones.  
Exchange to the side.

	TH	H	T	O
	3	8	7	1
x			4	5
	1	9	3	5
			5	5

**Step 3**

Insert a place holder.

	TH	H	T	O
	3	8	7	1
x			4	5
	1	9	3	5
			5	5
				0

**Step 4**

Multiply all digits by the tens.  
Exchange to the side.

	TH	H	T	O
	3	8	7	1
x			4	5
	1	9	3	5
			5	5
	1	5	4	8
			4	0

**Step 5**

Add all totals

	TH	H	T	O
	3	8	7	1
x			4	5
	1	9	3	5
			5	5
	1	5	4	8
			4	0
	1	7	4	1
		1		

## Multiplying decimals (up to 2 decimal points) by one-digit numbers

↳ exchanges

**Step 1** Set it out

$$2.53 \times 3 =$$

	O	.	th	hth
	2	.	5	3
x				3
<hr/>				
	.			

Include decimal place on answer line.

**Step 2** Multiply the hundredths by the ones.  
Exchange where needed.

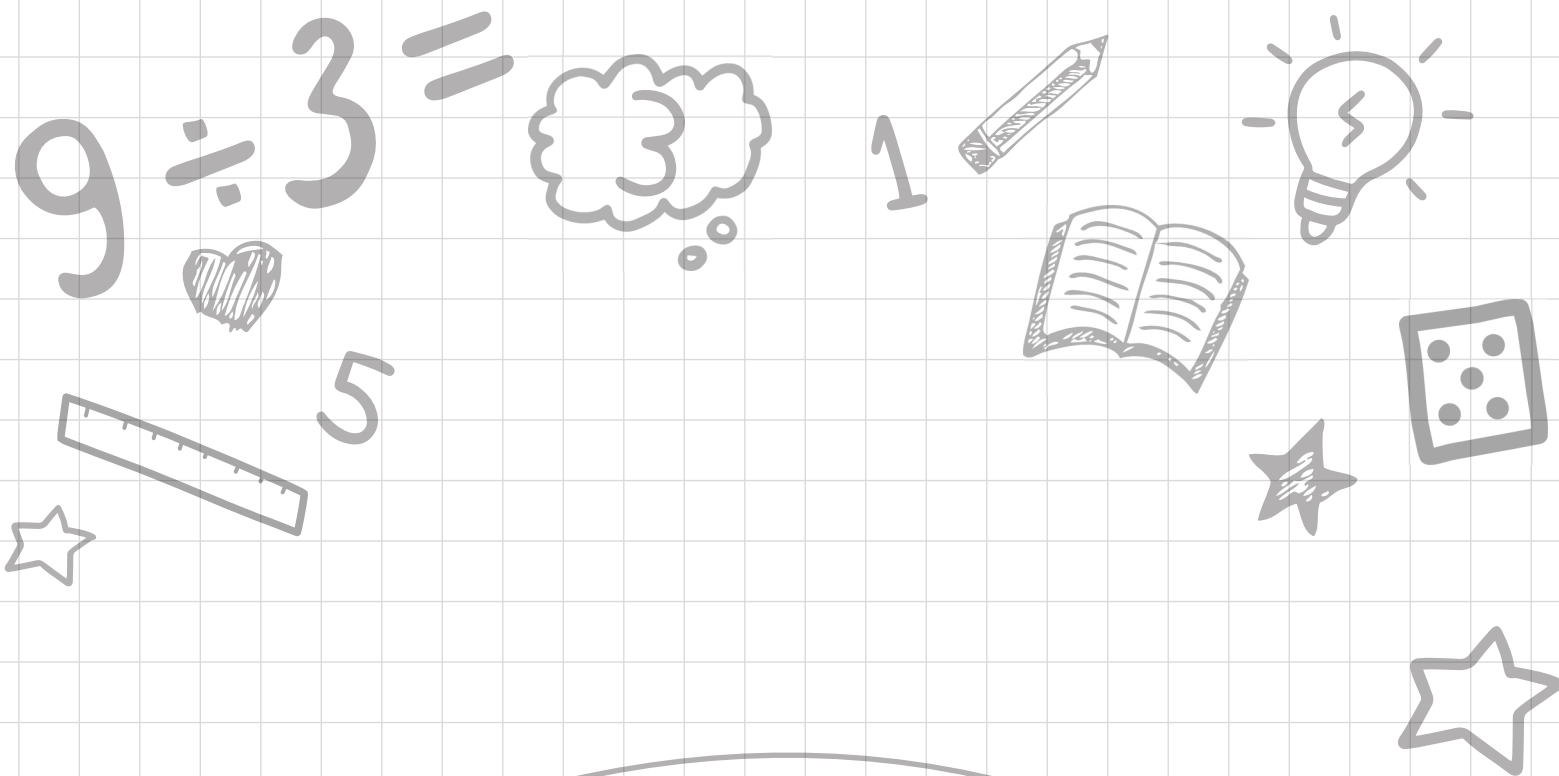
	O	.	th	hth
	2	.	5	3
x				3
<hr/>				
	.			9

**Step 3** Multiply the tenths by the ones.  
Exchange where needed.

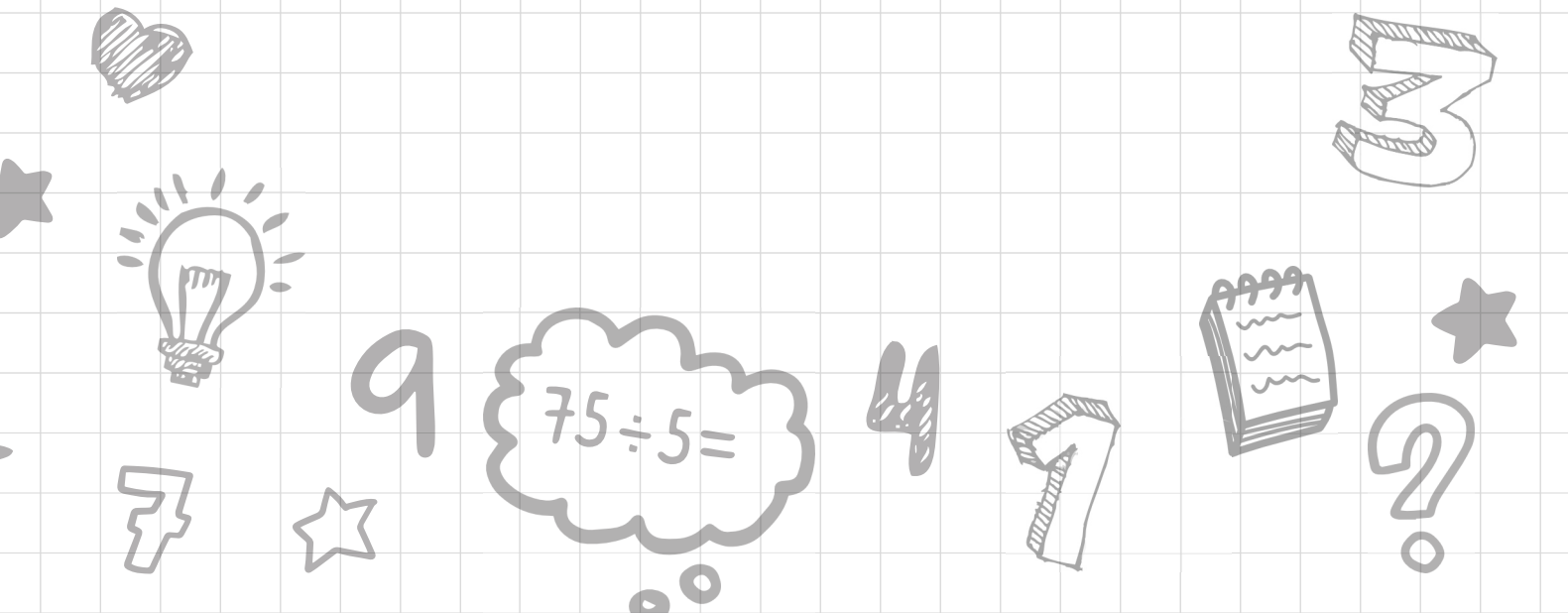
	O	.	th	hth
	2	.	5	3
x				3
<hr/>				
	.	5		9
				1

**Step 4** Multiply the ones by the ones.  
Add exchanged digits.

	O	.	th	hth
	2	.	5	3
x				3
<hr/>				
	7	.	5	9



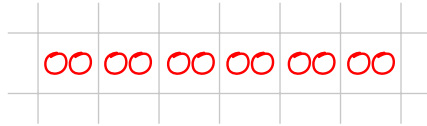
# DIVISION



To be able to solve one-step division problems using CPA with support of the teacher

**Step 1**

Count the total



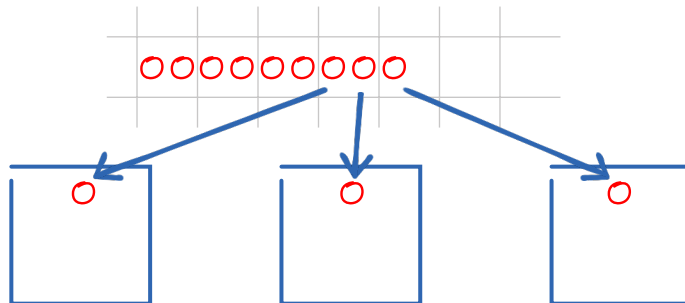
**Step 2**

Create the group



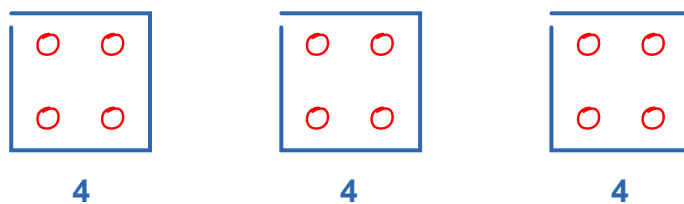
**Step 3**

Share the total equally - one at a time for each group



**Step 4**

Count the number in each group



To be able to solve division problems (including the use of  $\div$  and  $=$  symbols) using CPA (where known times tables can't be used).

**Step 1**

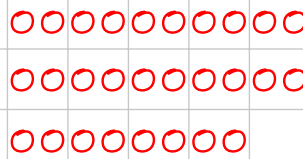
Write the calculation

$$28 \div 4 =$$

**Step 2**

Identify the dividend and count it out

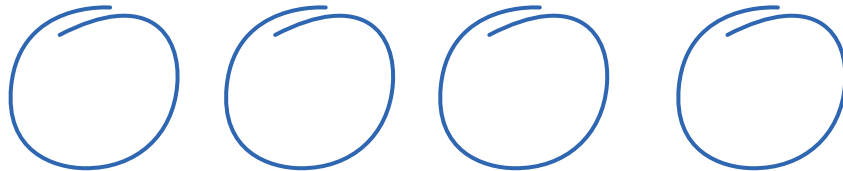
$$28 \div 4 =$$



**Step 3**

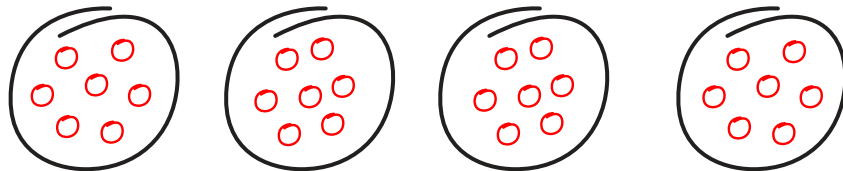
Identify the divisor and create groups

$$28 \div 4 =$$



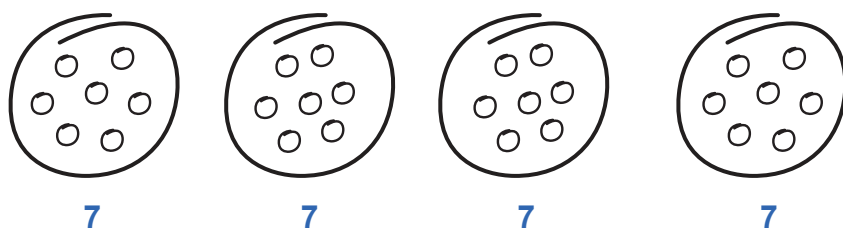
**Step 4**

Share the divided equally



**Step 5**

Check the number in each group to find the answer



## Dividing with place value counters progressing to a format written method - no remainders

### Step 1

Set it out

$$72 \div 6 =$$

Draw the same number of rows as the divisor.

T	O

### Step 2

Use place value counters to represent the dividend

$$72 \div 6 =$$



### Step 3

Share the tens equally into rows (divisor)

T	O
10	
10	
10	
10	
10	
10	

↓

	1 1
	1 1
	1 1
	1 1
	1 1
	1 1
	1 1

Don't forget the original ones.

### Step 4

Exchange the remainder for ones (if required)

### Step 5

Share the ones equally

T	O	
10	00	12
10	00	12
10	00	12
10	00	12
10	00	12
10	00	12
10	00	12

### Step 6

Count the number in each row

Formal written method, two-digit by one digit, exact answers with appropriate times tables ( $\div 2, 3, 4, 5, 8$ )

**Step 1**

Set it out

$$85 \div 5 =$$

$$5 \overline{) 85}$$

**Step 2**

Divide the first digit of the dividend by the divisor

$$5 \overline{) 85}$$

1

**Step 3**

Exchange the remainder

$$5 \overline{) 85}$$

1

3

**Step 4**

Divide the next digit by the dividend

$$5 \overline{) 85}$$

17

3



Short division, two or three-digit by one-digit, some answers with remainder (left as r\_)

### Step 1

Set it out

$$9 \ 2 \ 6 \div 7 =$$

$$7 \overline{) 9 \ 2 \ 6}$$

### Step 2

Divide the first digit of the dividend by the divisor

$$\begin{array}{r} 1 \\ 7 \overline{) 9 \ 2 \ 6} \end{array}$$

### Step 3

Regroup the remainder

$$\begin{array}{r} 1 \\ 7 \overline{) 9 \ 2 \ 6} \\ \phantom{0} 2 \end{array}$$

### Step 4

Divide the next digit(s) by the divisor

$$\begin{array}{r} 1 \ 3 \\ 7 \overline{) 9 \ 2 \ 6} \\ \phantom{0} 2 \end{array}$$

### Step 5

Regroup the remainder

$$\begin{array}{r} 1 \ 3 \\ 7 \overline{) 9 \ 2 \ 6} \\ \phantom{0} 2 \ 1 \end{array}$$

### Step 6

Divide the next digit(s) by the divisor and identify any remainders in your quotient

$$\begin{array}{r} 1 \ 3 \ 2 \ r \ 2 \\ 7 \overline{) 9 \ 2 \ 6} \\ \phantom{0} 2 \ 1 \end{array}$$

Short division up to four-digit by one-digit interpreting remainders appropriately

### Step 1

Set it out

$$4 \ 3 \ 2 \ 1 \div 5 =$$

$$5 \overline{) 4 \ 3 \ 2 \ 1}$$

### Step 2

Divide the first digit of the dividend by the divisor

$$0 \overline{) 4 \ 3 \ 2 \ 1}$$

### Step 3

Regroup the remainder

$$0 \overline{) 4 \ 3 \ 2 \ 1}$$

4

### Step 4

Continue to divide and regroup and dividend

$$0 \ 8 \ 6 \ 4 \ r \ 1 \overline{) 4 \ 3 \ 2 \ 1}$$

4   3   2   1

*\*Teacher to decide whether this needs to be broken into further steps\**

### Step 5

Identify the remainder

$$8 \ 6 \ 4 \ r \ 1$$

### Step 6

If necessary write the remainder as a fraction (or decimal) using the divisor as a denominator.

$$8 \ 6 \ 4 \ \frac{1}{5}$$

## Long division up to four-digit by two-digit interpreting remainders appropriately

### Step 1

Set it out

$$430 \div 15 =$$

$$15 \overline{) 430}$$

### Step 2

Divide the first digit by the divisor  $\rightarrow 0$

$$15 \overline{) 430} \begin{array}{r} 0 \\ \end{array}$$

### Step 3

Estimate the groups of the divisor that divide into the next two digits

$\begin{array}{r} 15 \\ \times 2 \\ \hline 30 \end{array}$	$\begin{array}{r} 15 \\ \times 3 \\ \hline 45 \\ \hline 1 \end{array}$
$\begin{array}{r} 02 \\ 15 \overline{) 430} \\ - 30 \\ \hline 13 \end{array}$	<h3>Step 4</h3>

Subtract and write the quantity

### Step 5

Bring the next digit down

$$\begin{array}{r} 02 \\ 15 \overline{) 430} \\ - 30 \quad \downarrow \\ \hline 130 \end{array}$$

### Step 6

Estimate

$\begin{array}{r} 15 \\ \times 9 \\ \hline 135 \\ \hline 4 \end{array}$	$\begin{array}{r} 15 \\ \times 8 \\ \hline 120 \\ \hline 4 \end{array}$
---	---



Step 7

Subtract

			0	2	8
1	5		4	3	0
		-	3	0	↓
			1	3	0
			1	2	0
			0	1	0

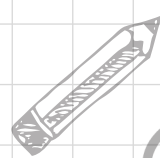
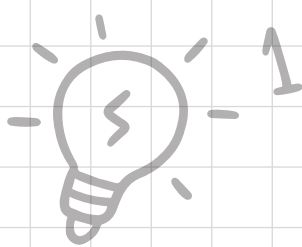
Step 8

Identify any remainders and change to a fraction where appropriate.

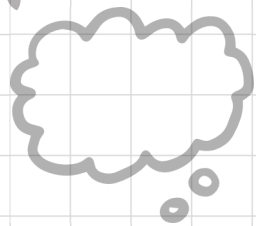
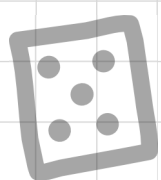
2	8	r	10	→	2	8	$\frac{10}{15}$	=	2	8	$\frac{2}{3}$
---	---	---	----	---	---	---	-----------------	---	---	---	---------------

*\*Children to start with examples with no remainders then build up to four-digits by two-digits.\**

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



5



# FRACTIONS



3

7

7



8



1

9

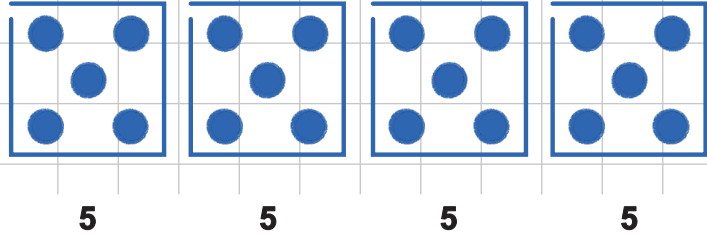


Finding fractions of amounts (  $\frac{1}{2}$  then  $\frac{1}{4}$  then  $\frac{1}{3}$  then  $\frac{2}{4}$  then  $\frac{3}{4}$  )  
with use of the bar model

**Step 1**

Divide by the denominator.  
Count into bar model.

$$\frac{1}{4} \text{ of } 20 =$$



**Step 2**

Multiply by the numerator.

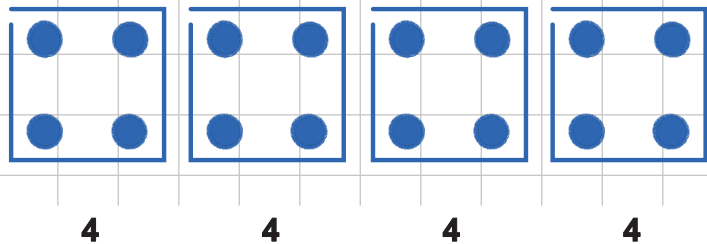
→ Select the number of groups.

$$5 \times 1 = 5$$

**Step 1**

Divide by the denominator.  
Count into the bar model.

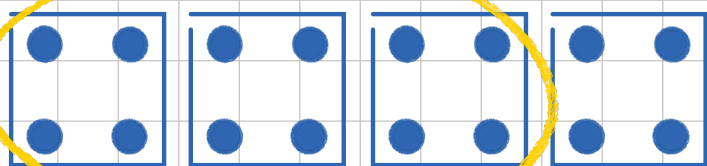
$$\frac{3}{4} \text{ of } 16 =$$



**Step 2**

Multiply by the numerator.

$$4 \times 3 = 12$$



## Adding fractions with the same denominator

Step 1

Set it out

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

Step 2

Add the numerators

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

Step 3

Denominator stays the same

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



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

*\*Year 3 adding only within a whole\**

## Subtracting fractions with the same denominator.

Step 1

Set it out

$$\frac{3}{5} - \frac{1}{5} =$$

Step 2

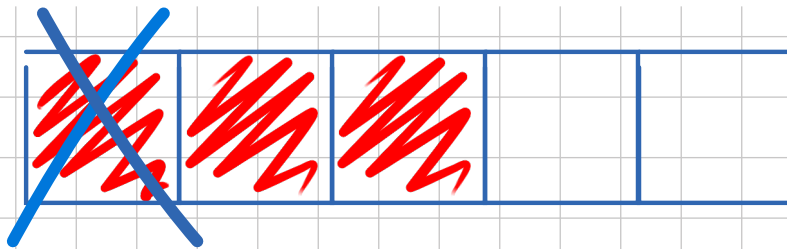
Subtract the numerators

$$\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$$

Step 3

Denominator stays the same

$$\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$$



$$\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$$

*\*Year 3 subtracting within a whole\**



*Adding fractions with the same denominator  
(more than a whole)*

**Step 1**

Add the numerator

$$\frac{4}{9} + \frac{8}{9} = \frac{12}{9}$$

**Step 2**

Denominator stays the same

$$\frac{4}{9} + \frac{8}{9} = \frac{12}{9}$$

**Step 3**

Convert the improper fraction to a mixed number

$$\frac{12}{9} = 1 \frac{3}{9}$$

*\*See separate step  
link to converting\**

*Subtracting fractions with the same denominator  
(more than a whole)*

**Step 1**

Subtract the numerator

$$\frac{12}{5} - \frac{9}{5} = \frac{3}{5}$$

**Step 2**Denominator stays  
the same

$$\frac{12}{5} - \frac{9}{5} = \frac{3}{5}$$

**Step 3**

Convert to a mixed number if necessary

*Adding a mixed number to another fraction***Step 1**

Set it out

$$2 \frac{2}{5} + \frac{4}{5} =$$

**Step 2**

Convert to an improper fraction

$$2 \frac{2}{5} = \frac{12}{5}$$

**Step 3**

Add fraction

$$\frac{12}{5} + \frac{4}{5} = \frac{16}{5}$$

**Step 4**

Convert answer to a mixed number

$$\frac{16}{5} = 3 \frac{1}{5}$$

*Subtracting from a mixed number***Step 1**

Set it out

$$2 \frac{1}{5} - \frac{4}{5} =$$

**Step 2**

Convert to an improper fraction

$$2 \frac{1}{5} = \frac{11}{5}$$

**Step 3**

Subtract

$$\frac{11}{5} - \frac{4}{5} = \frac{7}{5}$$

**Step 4**Convert to a mixed number  
if necessary

$$\frac{7}{5} = 1 \frac{2}{5}$$

*\*Remember to recap common factors, multiples and equivalent fractions before this\**

**Additions of fractions with different denominators within one (multiples of the same family)**

**Step 1**

Set it out

$$\frac{1}{2} + \frac{1}{8} =$$

**Step 2**

Find the lowest common denominator

$$\frac{1}{2} \quad \frac{1}{8}$$

$$\frac{\quad}{8} \quad \frac{\quad}{8}$$

**Step 3**

Find the numerator of the equivalent fraction

$$\frac{1}{2} \quad \frac{1}{8}$$

x4

$$\frac{4}{8} \quad \frac{1}{8}$$

**Step 4**

Solve the calculation

$$\frac{4}{8} + \frac{1}{8} = \frac{5}{8}$$

## Subtraction of fractions with different denominators within one (multiples of the same family)

**Step 1**

Set it out

$$\frac{4}{10} - \frac{1}{5} =$$

**Step 2**

Find the lowest common denominator

$$\frac{4}{10} \quad \frac{1}{5}$$

$$\frac{\quad}{10} \quad \frac{\quad}{10}$$

**Step 3**

Find the numerator of the equivalent fraction

$$\frac{4}{10} \quad \frac{1}{5}$$

$$\frac{4}{10} \quad \frac{2}{10}$$

x2

**Step 4**

Solve the calculation

$$\frac{4}{10} - \frac{2}{10} = \frac{2}{10}$$

*Adding fractions with a total greater than one with different denominators (multiples of the same family)*

Step 1

Set it out

$$\frac{2}{3} + \frac{5}{6} =$$

Step 2

Find the lowest common denominator

$$\frac{2}{3} \qquad \frac{5}{6}$$

$$\underline{\qquad} \qquad \underline{\qquad}$$

$$\underline{\qquad} \qquad \underline{\qquad}$$

Step 3

Find the numerator of the equivalent fraction

$$\frac{2}{3} \qquad \frac{5}{6}$$

x2

$$\frac{4}{6} \qquad \frac{5}{6}$$

Step 4

Solve the calculation

$$\frac{4}{6} + \frac{5}{6} = \frac{9}{6}$$

Step 5

Convert the answer to a mixed number

$$\frac{9}{6} = 1 \frac{3}{6}$$

*Simplify if necessary*

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

*Subtracting fractions with a total greater than one with different denominators (multiples of the same family)*

Step 1

Set it out

$$\frac{12}{5} - \frac{4}{10} =$$

Step 2

Find the lowest common denominator

$$\frac{12}{5} - \frac{4}{10}$$

$$\frac{\quad}{10} \quad \frac{\quad}{10}$$

Step 3

Find the numerator of the equivalent fraction

$$\frac{12}{5} \quad \frac{4}{10}$$

x2

$$\frac{24}{10} - \frac{4}{10}$$

Step 4

Solve the calculation

$$\frac{24}{10} - \frac{4}{10} = \frac{20}{10}$$

Step 5

Convert the answer to a mixed number

$$\frac{20}{10} = 2$$



*Adding to a mixed number with different denominators  
(multiples of the same family)*

Step 1

Set it out

$$3 \frac{2}{5} + \frac{3}{10} =$$

Step 2

Convert to an improper fraction

$$\frac{17}{5} + \frac{3}{10} =$$

Step 3

Find the lowest common denominator

$$\frac{\quad}{10} \quad \frac{\quad}{10}$$

Step 4

Find the numerator of the equivalent fraction

$$\begin{array}{cc} \frac{17}{5} & \frac{3}{10} \\ \curvearrowright \text{x2} & \\ \frac{34}{10} & \frac{3}{10} \end{array}$$

Step 5

Solve the calculation

$$\frac{34}{10} + \frac{3}{10} = \frac{37}{10}$$

Step 6

Convert the answer to a mixed number

$$\frac{37}{10} = 3 \frac{7}{10}$$

*Subtracting from a mixed number with different denominators  
(multiples of the same family)*

Step 1

Set it out

$$2 \frac{1}{2} - \frac{3}{10} =$$

Step 2

Convert to an improper fraction

$$\frac{5}{2} - \frac{3}{10} =$$

Step 3

Find the lowest common denominator

$$\frac{5}{2} - \frac{3}{10}$$

$$\frac{\quad}{10} - \frac{\quad}{10}$$

Step 4

Find the numerator of the equivalent fraction

$$\frac{5}{2} - \frac{3}{10}$$

x5

$$\frac{25}{10} - \frac{3}{10}$$

Step 5

Solve the calculation

$$\frac{25}{10} - \frac{3}{10} = \frac{22}{10}$$

Step 6

Convert the answer to a mixed number

$$\frac{22}{10} = 2 \frac{2}{10}$$

*Multiply a unit fraction by an integer***Step 1**

Set it out

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

**Step 2**

Convert the integer to a fraction over 1

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

**Step 3**

Multiply the numerators

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

**Step 4**

Multiply the denominators

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

**Step 5**

Convert to a mixed number where necessary

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

*Multiply a non-unit fraction by an integer***Step 1**

Set it out

$$\frac{3}{10} \times 3$$

**Step 2**

Convert the integer to a fraction over 1

$$\frac{3}{10} \times \frac{3}{1}$$

**Step 3**

Multiply the numerators

$$\frac{3}{10} \times \frac{3}{1} = \frac{9}{10}$$

**Step 4**

Multiply the denominators

$$\frac{3}{10} \times \frac{3}{1} = \frac{9}{10}$$

**Step 5**

Convert to a mixed number where necessary

*Multiply a mixed number by an integer*

Step 1

Set it out

$$6 \times 2 \frac{3}{5}$$

Step 2

Convert to an improper fraction

$$6 \times \frac{13}{5}$$

Step 3

Convert the integer to a fraction over 1

$$\frac{6}{1} \times \frac{13}{5}$$

Step 4

Multiply the numerators

$$\frac{6}{1} \times \frac{13}{5} = \frac{78}{5}$$

Step 5

Multiply the denominators

$$\frac{6}{1} \times \frac{13}{5} = \frac{78}{5}$$

Step 6

Convert answer to mixed number

$$\frac{78}{5} = 15 \frac{3}{5}$$

$$\begin{array}{r} 15 \text{ r } 3 \\ 5 \overline{) 78} \\ \underline{50} \phantom{0} \\ 28 \\ \underline{25} \\ 3 \end{array}$$

Add and subtract any two fractions

Step 1

Set it out

$$\frac{5}{6} + \frac{5}{7}$$

Step 2

Find the lowest common denominator

$$\frac{5}{6} \qquad \frac{5}{7}$$


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$$42 \qquad 42$$

Step 3

Find the equivalent fractions

$$\frac{5}{6} \qquad \frac{5}{7}$$
$$\frac{35}{42} \qquad \frac{30}{42}$$

Step 4

Solve the calculation

$$\frac{35}{42} + \frac{30}{42} = \frac{75}{42}$$

Step 5

Convert the answer to a mixed number

$$\frac{75}{42} = 1 \frac{33}{42}$$

*Multiply fractions by fractions*

Step 1

Set it out

$$\frac{2}{8} \times \frac{1}{4} =$$

Step 2

Multiply the numerator

$$\frac{2}{8} \times \frac{1}{4} = \frac{2}{}$$

Step 3

Multiply the denominators

$$\frac{2}{8} \times \frac{1}{4} = \frac{2}{32}$$

Step 4

Simplify where necessary

$$\frac{2}{32} = \frac{1}{16}$$

Diagram showing simplification: A blue arc connects the numerator 2 of the first fraction to the denominator 32 of the second fraction, with a circle containing  $\div 2$  above it. Another blue arc connects the denominator 32 of the first fraction to the denominator 16 of the second fraction, with a circle containing  $\div 2$  below it.

*Divide any fraction by an integer*

Step 1

Set it out

$$\frac{2}{3} \div 3 =$$

Step 2

Convert the integer to a fraction over 1

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

Step 3

K F C  
Keep, flip, change

Keep                      Flip

↓                              ↙

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

↑

Change

Step 4

Solve the calculation

$$\frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$$