Year 5

Arithmetic

Workbook

by Richard Brown

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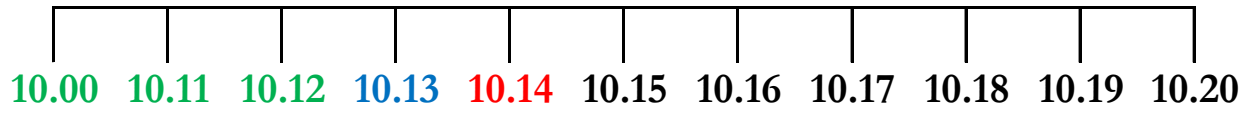
Key Language and Representations

Reasoning Scenarios are the arithmetic test questions applied to a real-life reasoning and problem solving scenario.

Number Lines are used to count forwards and backwards in whole, decimal numbers and fractional numbers.



Concrete Objects are manipulated or handled to calculate and represent a number sentence i.e. base 10, cuisenaire, fraction tiles, metric rulers, .

Formal Written Methods set out working in columnar form.

Ladder Method

```
  1  2  9
x       7
-------
     6  3
  1  4  0
+ 7  0  0
  1
-------
  9  0  3
-------
```

Grid Method

x	200	60	7
4	800	240	28

Short Multiplication

```
  1  7  3
x       5
-------
  3  1
-------
  8  6  5
-------
```

```
     1  3  0
x          9
-------
     2
-------
  1  1  7  0
-------
```

Long Division

```
     0  6  7  r 1
   -------------
2 | 1  13 15
  - 0
  -----
    1  3
  - 1  2
  -------
       1  5
     - 1  4
     -------
          1
```

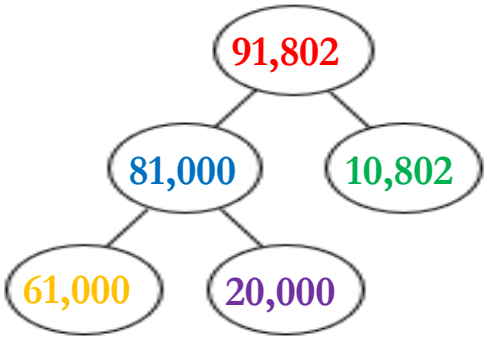
Short Division

```
     0  6  7  r 1
   -------------
2 | 1  13 15
```

```
     0  4  3  r 1
   -------------
4 | 1  17 13
```

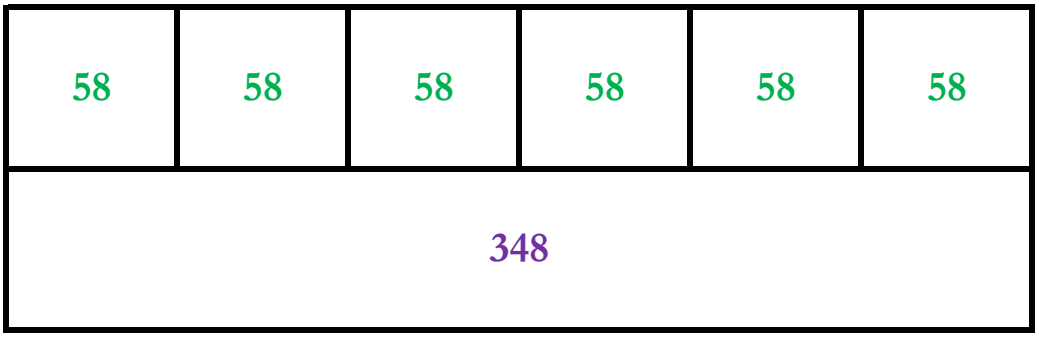
Strategy Applied is when formal written method is used to calculate an arithmetic question or a reasoning and problem solving scenario. Explained using appropriate mathematical language, proven using concrete objects that can be manipulated, shown with pictorial representations to visualise the calculations, enabling deeper understanding.

Part Whole Models are pictorial mathematical images to represent an arithmetic question or reasoning and problem solving scenario.



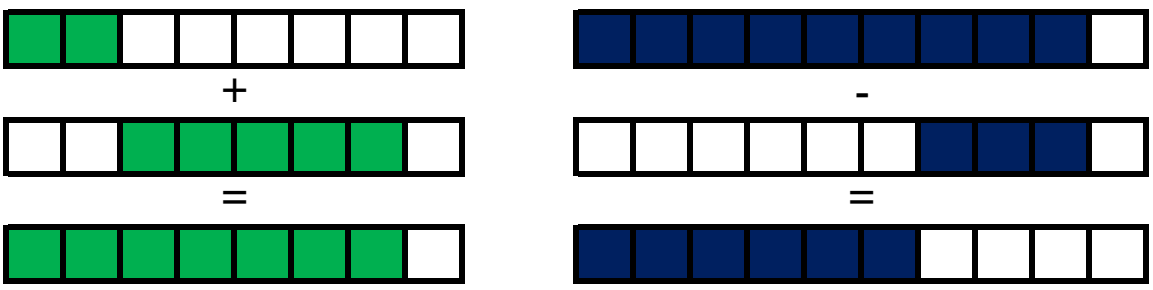
Bar Models are an image, that pictorially represents a calculation.

$$58 \times 6 = 548$$



$$\frac{2}{8} + \frac{5}{8} = \frac{7}{8}$$

$$\frac{9}{10} - \frac{3}{10} = \frac{6}{10}$$



Number Grid

0	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	101	102	103	104	105	106	107	108	109
110	111	112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127	128	129
130	131	132	133	134	135	136	137	138	139
140	141	142	143	144	145	146	147	148	149
150	151	152	153	154	155	156	157	158	159

Multiplication Square

x	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0
1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100
11	22	33	44	55	66	77	88	99	110
12	24	36	48	60	72	84	96	108	120

Decimal Number Grid

0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9
3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9
6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9
7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9
9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9
10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9
11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9
12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9
13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9
14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9
15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9

Fraction Walls

1 Whole															
$\frac{1}{2}$								$\frac{1}{2}$							
$\frac{1}{4}$				$\frac{1}{4}$				$\frac{1}{4}$				$\frac{1}{4}$			
$\frac{1}{8}$		$\frac{1}{8}$		$\frac{1}{8}$		$\frac{1}{8}$		$\frac{1}{8}$		$\frac{1}{8}$		$\frac{1}{8}$		$\frac{1}{8}$	
$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$

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

1 Whole									
$\frac{1}{2}$					$\frac{1}{2}$				
$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$	
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$

How Many

How many **1,000,000s** (millions), **100,000s** (hundred thousands) and **10,000s** (ten thousands) are there in the number **7,654,321?**

1) **7,654,321** = ___

Word Problem

The number **seven million, six hundred and fifty four thousand, three hundred and twenty one** is a **7-digit number**.
The **digits** represent the following **column place values** the **1,000,000s**, **100,000s**, **10,000s**, **1,000s**, **10s** and **1s**.
Work out how many **1,000,000s**, **100,000s** and **10,000s** there are.

Strategy Applied

On a **Place Value Grid** show the number **seven million, six hundred and fifty four thousand, three hundred and twenty one**.

7 represents how many **millions** there are.
6 represents how many **hundred thousands** there are.
5 represents how many **ten thousands** there are.
4 represents how many **thousands** there are.
3 represents how many **hundreds** there are.
2 represents how many **tens** there are.
1 represents how many **ones** there are.

First, write 7 in the **1,000,000s** column place value.
Then, write 6 in the **100,000s** column place value.
Next, write 5 in the **10,000s** column place value.
Then, write 4 in the **1,000s** column place value.
Next, write 3 in the **100s** column place value.
Then, write 2 in the **10s** column place value.
Next, write 1 in the **1s** column place value.
Finally, there are 7 **millions**, 6 **hundred thousands**, 5 **ten thousands**.

Place Value Grid

1,000,000s	100,000s	10,000s	1,000s	100s	10s	1s
7	6	5	4	3	2	1

Test Questions

How many **1,000,000s** (millions), **100,000s** (hundred thousands) and **10,000s** (ten thousands) in each number?

1) 7,654,321 = ___

2) 5,124,619 = ___

3) 6,217,983 = ___

4) 9,353,774 = ___

5) 8,406,861 = ___

6) 3,537,902 = ___

7) 1,601,393 = ___

8) 2,721,548 = ___

9) 5,834,657 = ___

10) 6,095,372 = ___

Digit Value

What is the digit value of the **1,000,000s** (millions), **100,000s** (hundred thousands) and **10,000s** (tens thousands) in the number **7,654,321?**

1) **7,654,321** = ___

Word Problem

The number **seven million, six hundred and fifty four thousand, three hundred and twenty one** is a **7-digit number**.
Each **digit** represent the **1,000,000s**, **100,000s**, **10,000s**, **1,000s**, **10s** and **1s column place values**.
What is the digit value of the **1,000,000s**, **100,000s** and **10,000s** columns.

Strategy Applied

On a **Place Value Grid** show the number **seven million, six hundred and fifty four thousand, three hundred and twenty one**.
The **7** represents the digit value of the **millions**.
The **6** represents the digit value of the **hundred thousands**.
The **5** represents the digit value of the **ten thousands**.
The **4** represents the digit value of the **thousands**.
The **3** represents the digit value of the **hundreds**.
The **2** represents the digit value of the **tens**.
The **1** represents the digit value of the **ones**.

First, write **7,000,000** in the **1,000,000s** column place value.
Then, write **600,000** in the **100,000s** column place value.
Next, write **50,000** in the **10,000s** column place value.
Then, write **4,000** in the **1,000s** column place value.
Next, write **300** in the **100s** column place value.
Then, write **20** in the **10s** column place value.
Next, write **1** in the **100s** column place value.
Finally, the **Place Value Grid shows** the digit value of the **millions**, **hundred thousands** and **ten thousands** is **7,000,000**, **600,000**, **50,000**.

Place Value Grid

1,000,000s	100,000s	10,000s	1,000s	100s	10s	1s
7,000,000	600,000	50,000	4,000	300	20	1

Test Questions

What is the digit value of the **1,000,000s** (millions), **100,000s** (hundred thousands) and **10,000s** (tens thousands) in each number?

1) 7,654,321 = ___

2) 5,124,619 = ___

3) 6,217,983 = ___

4) 9,353,774 = ___

5) 8,406,861 = ___

6) 3,537,902 = ___

7) 1,601,393 = ___

8) 2,721,548 = ___

9) 5,834,657 = ___

10) 6,095,372 = ___

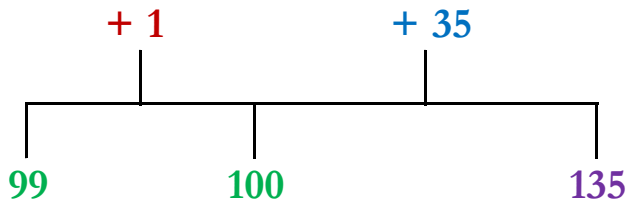
Compensate

1) 99 + 35 = ?

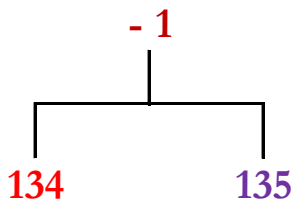
Word Problem

Ninety nine pounds is the current balance of a bank account.
It is increased by a further thirty five pounds.
What is the new bank balance?

Step 1



Step 2



Strategy Applied

When the **value** of a number is near in value to a **multiple of 10s**, **100s**, **1,000s**, it can be more efficient to **round up/down** to an appropriate **multiple**, before working out the calculation or number sentence.

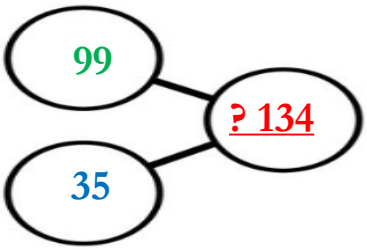
Step 1

Compensate by rounding 99 up to 100, by adding 1.
Then from one hundred count on thirty five more, equal to **one hundred and thirty five**.

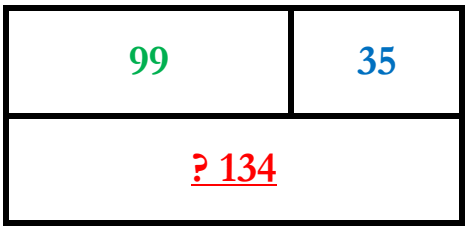
Step 2

Decompensate by subtracting 1 from **one hundred and thirty five**, to equal the total value of **one hundred and thirty four**.

Part Whole Model



Bar Model



Test Questions

1) 99 + 35 = ___

2) 999 + 479 = ___

3) 9,999 + 361 = ___

4) 98 + 205 = ___

5) 998 + 406 = ___

6) 9,998 + 2,100 = ___

7) 97 + 1,820 = ___

8) 997 + 3,009 = ___

9) 9,997 + 403 = ___

10) 96 + 140 = ___

11) 996 + 903 = ___

12) 9,996 + 8,036 = ___

13) 95 + 216 = ___

14) 995 + 1,307 = ___

15) 9,995 + 5,038 = ___

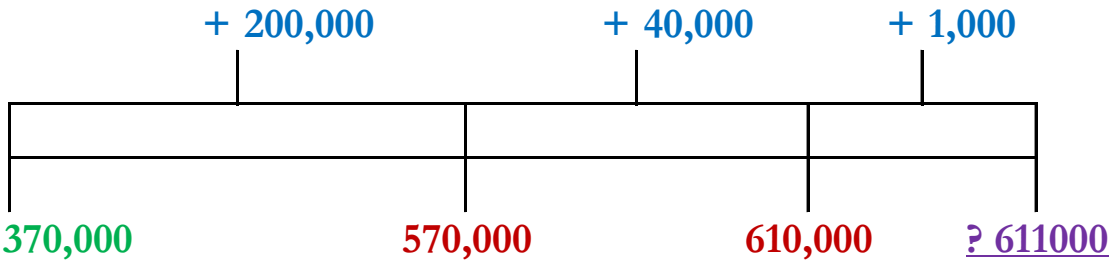
More Than 10,000

1) 370,000 + 241,000 = ?

Word Problem

A value of **three hundred and seventy thousand** is **increased** by **two hundred and forty one thousand.**
What is the **total value** of the two values**?**

Number Line



Strategy Applied

Partition 241,000 into its **digit values** of 200,00 + 40,000 + 1,000.

First, draw a number line and write **three hundred and seventy thousand** at the start.

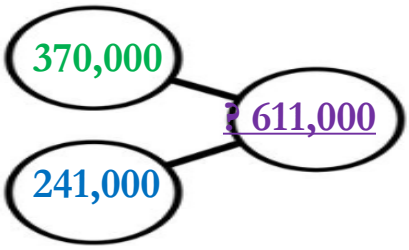
Then, from **370,000** count on **200,000** more in **multiples of 100,000s**, equal to **five hundred and seventy thousand**.

Next, from **570,000** count on **40,000** more in **multiples of 10,000s**, equal to **six hundred and ten thousand**.

Then, from **610,000** count on **1,000** more in **multiples of 1,000s**, equal to **six hundred and eleven thousand**.

Finally, the missing number is **611,000**.

Part Whole Model



Bar Model

370,000	241,000
? 611,000	

Test Questions

1) 370,000 + 241,000 = ___

2) 230,000 + 370,000 = ___

3) 150,000 + 63,000 = ___

4) 105,000 + 326,000 = ___

5) 840,000 + 70,000 = ___

6) 370,000 + 95,000 = ___

7) 210,000 + 450,000 = ___

8) 150,000 + 75,000 = ___

9) 220,000 + 290,000 = ___

10) 840,000 + 55,000 = ___

11) ___ + 9,200 = 80,400

12) ___ + 4,006 = 29,006

13) ___ + 5,810 = 63,000

14) ___ + 2,510 = 40,050

Number Sequence

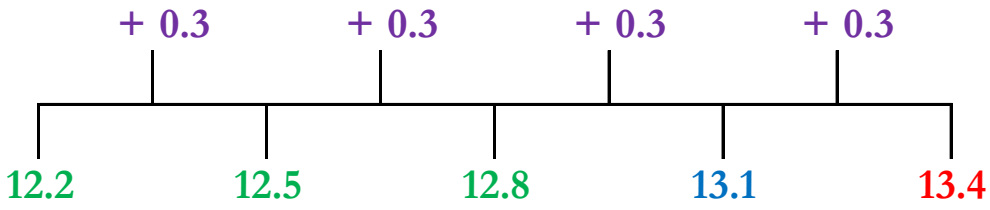
In the **number sequence** below, find the next two **consecutive terms**.

1) 12.2 12.5 12.8 ? ?

Word Problem

The **number sequence** is modelled during a maths lesson.
The next two **consecutive terms** are missing and the Teacher would like the children to work them out with their working partners what they are.

Number Line



Strategy Applied

Work out the **number sequence**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count forwards** from **twelve point two** to **twelve point five** equal to **zero point three**, the rule is **+0.3**.

Then, count forwards from **twelve point five** to **twelve point eight** equal to **zero point three**, the rule is **+0.3**.

The rule is **+0.3** (**count on zero point three**) to each of the numbers in the number sequence.
Continue this **number pattern** to find the next two **consecutive terms**.

Next, from **twelve point eight** count on **zero point three** more, equal to **thirteen point one**.

Then, from **thirteen point one** count on **zero point three** more, equal to **thirteen point four**.

Finally, the next two consecutive terms in the number sequence are **thirteen point one** and **thirteen point four**.

Decimal Number Grid

12.0	12.1	12.2 →	**12.3**	**12.4**	12.5 →	**12.6**	**12.7**	12.8 →	**12.9**
13.0	13.1 →	**13.2**	**13.3** →	13.4	13.5	13.6	13.7	13.8	13.9

Test Questions

1) 12.2 12.5 12.8 ___ ___

2) -14 -8 -2 ___ ___

3) 30 45 60 ___ ___

4) 150 225 300 ___ ___

5) -500 -450 -400 ___ ___

6) -95 -60 -25 ___ ___

7) 0 1.9 2.8 ___ ___

8) 3.6 4.5 5.4 ___ ___

9) 1.0 1.9 2.8 ___ ___

10) -1.95 -1.05 -0.15 ___ ___

11) $\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ ___ ___

12) $\frac{1}{3}$ $\frac{4}{3}$ $\frac{7}{3}$ ___ ___

Decimals

1) 2.14 + 1.835 = ?

Word Problem

Journey A is **two point one four** kilometres and **Journey B** is **one point eight three five** kilometres. What is the **total distance** of both journeys**?**

Partitioning

2	.	0	0	0	+	1	.	0	0	0	=	3	.	0	0	0
0	.	1	0	0	+	0	.	8	0	0	=	0	.	9	0	0
0	.	0	4	0	+	0	.	0	3	0	=	0	.	0	7	0
0	.	0	0	0	+	0	.	0	0	5	=	0	.	0	0	5
												3	.	9	7	5

Strategy Applied

Partition both numbers into **1s**, **10ths**, **100ths**, **1000ths** and add together their relative **digit values**.

2.14 = 2 + 0.1 + 0.04 1.835 = 1 + 0.8 + 0.03 + 0.005

First, add the **1s** digit values of 2 and 1, equal to **three**.

Then, add the **10ths** digit values of 0.1 and 0.8, equal to **zero point nine**.

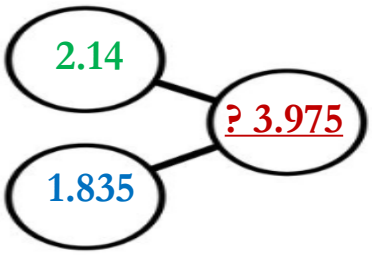
Next, add the **100ths** digit values of 0.04 and 0.03, equal to **zero point zero seven**.

Then, add the **1000ths** digit values of 0.000 and 0.005, equal to **zero point zero zero five**.

Next, use column addition to add the values of **3** + **0.9** + **0.07** + **0.005**.

Finally, 2.14 plus 1.835 is equal to **3.975**.

Part Whole Model



Bar Model

2.14	1.835
? 3.975	

Test Questions

1) 2.14 + 1.835 = ___

2) 1.36 + 2.513 = ___

3) 2.61 + 6.352 = ___

4) 7.58 + 1.416 = ___

5) 6.23 + 1.759 = ___

6) 4.75 + 2.138 = ___

7) 3.79 + 4.205 = ___

8) 6.13 + 3.982 = ___

9) 1.97 + 8.134 = ___

10) 3.65 + 3.256 = ___

11) ___ = 5.40 + 2.209

12) ___ = 6.70 + 3.348

13) ___ = 5.50 + 1.768

14) ___ = 7.20 + 1.952

Column Addition

1) **491,257 + 218,278 = ?**

Step 1

	4	9	1	2	5	7
	2	1	8	2	7	8
					3	5
					1	

Step 2

	4	9	1	2	5	7
+	2	1	8	2	7	8
				9	5	3	5
					1	1	

Step 3

	4	9	1	2	5	7
+	2	1	8	2	7	8
	7	0	9,	5	3	5
	1			1	1	

Strategy Applied

Step 1

First, in the **1s** column add **altogether**, 7 + 8, equals 15 **ones** (**10** + **5**).
Write **5** in the **total value** of the **1s** column, then **exchange/regroup** the **10 ones** into **1 ten** to the **10s** column and write **1** below the **total value line** of the **10s** column.
Then, in the **10s** column add **altogether**, 5 + 7 + **1**, equals 13 **tens** (**100** + **30**).
Write **3** in the **total value** of the **10s** column, then **exchange/regroup** the **10 tens** into **1 hundred** to the **100s** column and write **1** below the **total value line** of the **100s** column.

Step 2

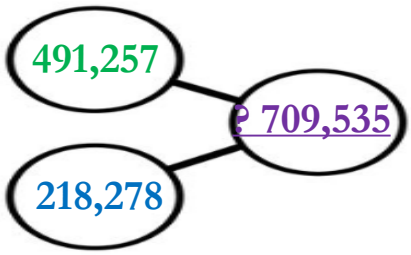
Next, in the **100s** column add **altogether**, 2 + 2 + **1**, equals 5 **hundreds** (**500**).
Write **5** in the **total value** of the **100s** column.
Then, in the **1,000s** column add **altogether**, 1 + 8, equals 9 **thousands** (**9,000**).
Write **9** in the **total value** of the **1,000s** column.

Step 3

Next, in the **10,000s** column add **altogether**, 9 + 1, equals 10 **ten thousands** (**100,000** + **0**).
Write **0** in the **total value** of the **10,000s** column, then **exchange/regroup** the **10 ten thousands** into **1 hundred thousand** to the **100,000s** column and write **1** below the **total value line** of the **100,000s** column.

Finally, in the **100,000s** column add **altogether**, 4 + 2 + **1**, equals 7 **hundred thousands** (**700,000**). Write **7** in the **total value** of the **100,000s** column.
Total value is **709,535**.

Part Whole Model



Bar Model

491,257	218,278
? 709,535	

Test Questions

1) 4 9 1 2 5 7
+ 2 1 8 2 7 8

2) 4 1 9 8 3 2
+ 3 9 6 2 7 1

3) 7 2 5 3 2
5 0 9 1 5
+ 3 3 3 3 7

3) 5 2 4 7 6 9
+ 2 8 0 1 5 5

4) 4 2 8 0 5 6
+ 2 1 5 3 7 6

6) 8 3 2 1 1
7 1 4 0 0
+ 4 7 2 3 4

5) 4 1 9 0 4 9
+ 3 8 1 3 7 3

8) 3 8 0 8 8 6
+ 2 5 6 2 1 5

9) 5 2 7 8 7
5 4 8 3 0
4 3 0 4 6
+ 2 5 6 8 3

10) 4 7 2 8 9 8
+ 2 1 9 8 7 4

11) 7 5 5 5 5 4
+ 6 6 7 7 7 8

14) 6 2 8 9 3
5 6 8 4 1
5 3 0 4 9
+ 1 5 6 9 9

12) 9 8 0 8 4 1
+ 8 8 3 3 3 4

13) 4 3 3 3 3 7
+ 3 0 0 0 5 5

Column Addition with Decimals

1) **3 8 . 4 5 3 + 1 5 . 2 7 1 = ?**

Step 1

	3	**8**	**.**	**4**	**5**	**3**
+	**1**	**5**	**.**	**2**	**7**	**1**
			.	**2**	**4**	
				1		

Step 2

	3	**8**	**.**	**4**	**5**	**3**
+	**1**	**5**	**.**	**2**	**7**	**1**
			.	**7**	**2**	**4**
				1		

Step 3

	3	**8**	**.**	**4**	**5**	**3**
+	**1**	**5**	**.**	**2**	**7**	**1**
	5	**3**	**.**	**7**	**2**	**4**
	1			1		

Strategy Applied

Step 1

First, in the **1,000ths** column add **altogether**, 3 + 1, equals 4 **thousandths** (**0.004**).

Write **4** in the **total value** of the **1,000ths** column.

Then, in the **100ths** column add **altogether**, 5 + 7, equals 12 **hundredths** (**0.1** + **0.02**).

Write **2** in the **total value** of the **10ths** column, then **exchange/regroup** the **10** **hundredths** into **1** **tenth** to the **10ths** column and write **1** below the **total value line** of the **10ths** column.

Step 2

Next, in the **10ths** column add **altogether**, 4 + 2 + **1**, equals 7 **tenths** (**0.7**).

Write **7** in the **total value** of the **10ths** column.

Step 3

Then, in the **1s** column add **altogether**, 8 + 5, equals 13 **ones** (**10** + **3**).

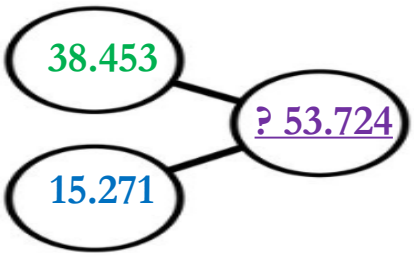
Write **3** in the **total value** of the **1s** column, then **exchange/regroup** the **10** **ones** into **1** **ten** to the **10s** column and write **1** below the **total value line** of the **10s** column.

Finally, in the **10s** column add **altogether**, 3 + 1 + **1**, equals 5 **tens** (**50**).

Write **5** in the **total value** of the **10s** column.

Total Value is **53.724**.

Part Whole Model



Bar Model

38.453	15.271
? 53.724	

Test Questions

1) 38.453 + 15.271 = .

2) 28.337 + 14.248 = .

3) 55.43 + 37.23 + 28.14 = .

4) 37.457 + 28.365 = .

5) 35.479 + 18.283 = .

6) 80.74 + 29.16 + 5.86 = .

7) 79.840 + 53.669 = .

8) 44.560 + 26.348 = .

9) 79.57 + 63.58 + 54.40 + 48.26 = .

10) 50.604 + 38.468 = .

11) 40.506 + 26.387 = .

14) 79.68 + 64.58 + 64.50 + 29.16 = .

12) 86.938 + 77.848 = .

13) 23.127 + 9.638 = .

Find the Missing Number

1) 600 + 4,000 - 1,250 = ?

Word Problem

Kavalli has **six hundred** pounds, **Eliza** has a further **four thousand** pounds. **Jaylon** has **one thousand, two hundred and fifty** pounds **less than** his two friends amounts **combined**.

Strategy Applied

There are two **operations** in the number sentence, **add** and **subtract**. First add 4,000 + 600 together and then subtract the 1,250

Step 1

$$\begin{array}{r} 4\ 0\ 0\ 0 \\ +\quad 6\ 0\ 0 \\ \hline 4,\ 6\ 0\ 0 \end{array}$$

Step 2

$$\begin{array}{r} \ 5\ 9 \\ 4\ \cancel{6}\ \overset{1}{\cancel{0}}\ \overset{1}{4} \\ -\quad 1\ 2\ 5\ 0 \\ \hline 3,\ 3\ 5\ 0 \end{array}$$

Step 1

Then, use a mental strategy or the written method of column addition to calculate 4,000 + 600 , which is equal to 4,600 .

Step 2

Then, use a mental strategy or the written method of column subtraction to calculate 4,600 - 1,250 , which is equal to 3,350 .

Test Questions

1) 600 + 4,000 - 1,250 = ___

2) 900 + 5,000 - 2,250 = ___

3) 368,701 + 1,000 + 1,000 = ___

4) 499,999 + 1,000 + 1,000 = ___

5) 288,888 + 2,000 + 2,000 = ___

6) 479,999 + 2,000 + 2,000 = ___

7) 238,888 + 3,000 + 3,000 = ___

8) ___ + 5,314 = 7,314 - 1,000

9) ___ + 6,425 = 8,425 - 1,000

10) 500 + 6,000 - 8,150 = ___

11) 800 + 7,000 - 9,150 = ___

12) ___ + 3,528 = 9,528 - 2,000

13) ___ + 1,012 = 5,012 - 2,000

14) 738,035 + 7,000 + 7,000 = ___

Compensate

1) 101 - 45 = ?

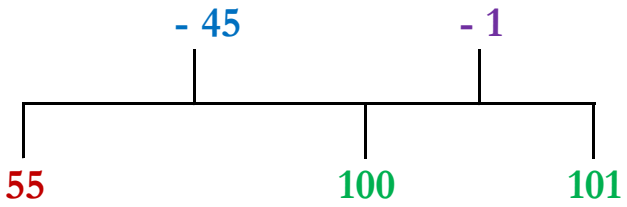
Word Problem

Crate A contains **one hundred and one** cans. **Crate B** has **forty five** cans **less**. How many cans in **Crate B?**

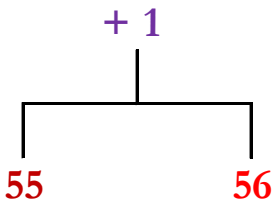
Strategy Applied

When the **value** of a number is near in value to a **multiple of 10s**, **100s** or **1,000s**, it can be more efficient to **round down** to the appropriate **multiple**, before working out the calculation or number sentence.

Step 1



Step 2



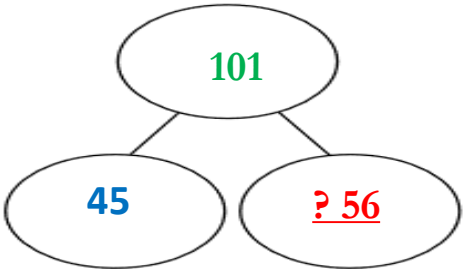
Step 1

Compensate by rounding **101** down to **100**, by subtracting **1**.
Then from **one hundred** count back **forty five** less, equal to **fifty five**.

Step 2

Decompensate by adding **1** to **fifty five**, to equal the **total value** of **fifty six**.

Part Whole Model



Bar Model

101	
45	? 56

Test Questions

1) 101 - 45 = ___

2) 1,001 - 479 = ___

3) 102 - 61 = ___

4) 1,002 - 205 = ___

5) 103 - 46 = ___

6) 1,003 - 210 = ___

7) 104 - 82 = ___

8) 1,004 - 309 = ___

9) 105 - 43 = ___

10) 1,005 - 140 = ___

11) 106 - 93 = ___

12) 1,006 - 836 = ___

13) 107 - 16 = ___

14) 1,007 - 307 = ___

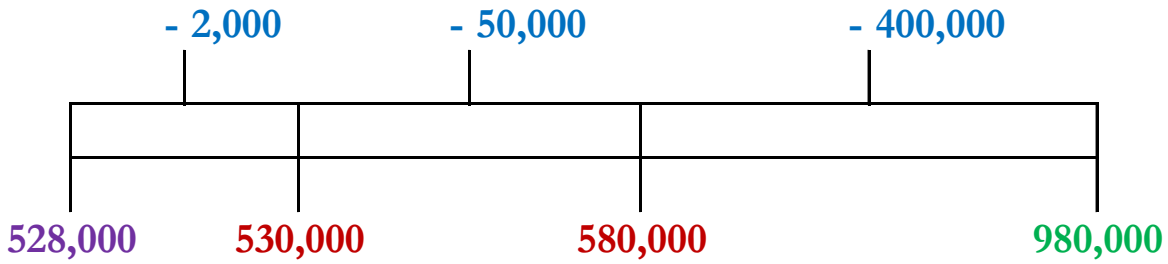
More Than 10,000

1) 980,000 - 452,000 = ?

Word Problem

Nine hundred and eighty thousand containers pass through a **Shipping Port** las year. Due to a **recession**, there will be **four hundred and fifty two thousand** **less** containers this year. How many will that be?

Number Line



Strategy Applied

Partition 452,000 into its **digit values** of **100,000s**, **10,000s**, **1,000s**, 400,000 + 50,000 + 2,000.

First, draw a number line and write **nine hundred and eighty thousand** at the end.

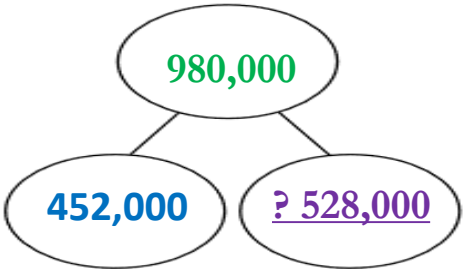
Then, from 980,000 count back 400,000 less in **multiples of 100,000s**, equal to **five hundred and eighty thousand**.

Next, from **580,000** count back 50,000 less in **multiples of 10,000s**, equal to **five hundred and thirty thousand**.

Then, from **530,000** count back 5,000 less in **multiples of 1,000s**, equal to **five hundred and twenty eight thousand**.

Finally, the missing number is **five hundred and twenty eight thousand**.

Part Whole Model



Bar Model

980,000	
452,000	? 528,000

Test Questions

1) 980,000 - 452,000 = ___

2) 760,000 - 48,000 = ___

3) 900,000 - 358,000 = ___

4) 750,000 - 60,000 = ___

5) 820,000 - 127,000 = ___

6) 980,000 - 193,000 = ___

7) 760,000 - 80,000 = ___

8) 800,000 - 781,000 = ___

9) 840,000 - 80,000 = ___

10) 820,000 - 796,000 = ___

11) 560,000 - 50,000 = ___

12) 900,000 - 672,000 = ___

13) 950,000 - 90,000 = ___

14) 930,000 - 685,000 = ___

Number Sequence

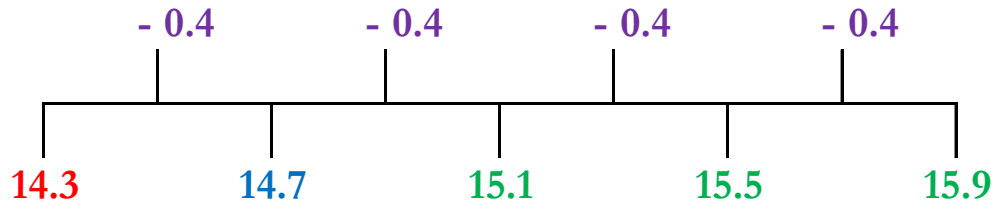
In the **number sequence** below, find the next two **consecutive terms**.

1) **15.9 15.5 15.1 ? ?**

Word Problem

A **number sequence** is modelled to a class during maths.
The next two **consecutive terms** are missing and the Teacher would like the children to work them out with their working partners what they are.

Number Line



Strategy Applied

Work out the **number sequence**, by finding out the **difference between** the **three** numbers.
The difference between each of the **three** numbers is known as the **rule**.

First, **count backwards** from **fifteen point nine** to **fifteen point five** equal to **zero point four**, the rule is **-0.4**.

Then, **count backwards** from **fifteen point five** to **fifteen point one** equal to **zero point four**, the rule is **-0.4**.

The rule is **-0.4** (**count back zero point four**) from each of the numbers in the number sequence.
Continue this **number pattern** to find the next two **consecutive terms**.

Next, from **fifteen point one** count back **zero point four** less, equal to **fourteen point seven**.

Then, from **fourteen point seven** count back **zero point four** less, equal to **fourteen point three**.

Finally, the next two consecutive terms in the number sequence are **fourteen point seven** and **fourteen point three**.

Decimal Number Grid

14.0	14.1	14.2	14.3 ←	14.4	14.5	14.6 ←	14.7	14.8	14.9
15.0 ←	15.1	15.2	15.3	15.4 ←	15.5	15.6	15.7	15.8 ←	15.9

Test Questions

1) 15.9 15.5 15.1 ___ ___

2) 18 10 2 ___ ___

3) 63 57 51 ___ ___

4) 950 800 750 ___ ___

5) 325 200 75 ___ ___

6) -195 -260 -325 ___ ___

7) 5.2 4.5 3.8 ___ ___

8) 8.5 8 7.5 ___ ___

9) 11.9 11.7 11.5 ___ ___

10) -3.05 -5.05 -7.05 ___ ___

11) $\frac{8}{9}$ $\frac{6}{9}$ $\frac{4}{9}$ ___ ___

12) $\frac{9}{8}$ $\frac{7}{8}$ $\frac{5}{8}$ ___ ___

Decimals

1) 2.135 - 1.024 = ?

Word Problem

The **capacity** of a jug is **two point one three five** litres of liquid.
It is filled with **one point zero two four** litres of milk.
How many more **litres** of milk can the jug hold**?**

Partitioning

2 . 0 0 0 - 1 . 0 0 0 = 1 . 0 0 0
0 . 1 0 0 - 0 . 0 0 0 = 0 . 1 0 0
0 . 0 3 0 - 0 . 0 2 0 = 0 . 0 1 0
0 . 0 0 5 - 0 . 0 0 4 = 0 . 0 0 1 +
1 . 1 1 1

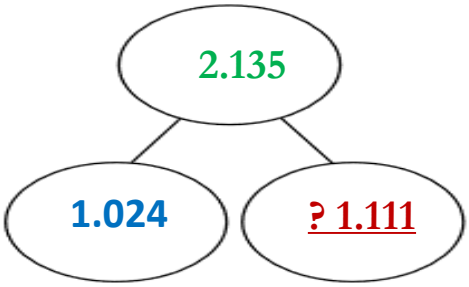
Strategy Applied

Partition both numbers into **1s**, **10ths**, **100ths**, **1000ths** and subtract their relative **digit values**.

2.135 = 2 + 0.1 + 0.03 + 0.005 1.024 = 1 + 0.0 + 0.02 + 0.004

First, subtract the **1s** digit values of 2 and 1, equal to **one**.
Then, subtract the **10ths** digit values of 0.1 and 0.0, equal to **zero point one**.
Next, subtract the **100ths** digit values of 0.03 and 0.02, equal to **zero point zero one**.
Then, subtract the **1000ths** digit values of 0.005 and 0.004, equal to **zero point zero** zero **one**.
Next, use column addition to add the values of 1 + 0.1 + 0.01 + 0.001.
Finally, the **value** of the missing number is **one point one one one**.

Part Whole Model



Bar Model

2.135	
1.024	? 1.111

Test Questions

1) 2.135 - 1.024 = ___

2) 2.579 - 1.358 = ___

3) 6.324 - 2.11 = ___

4) 7.546 - 1.43 = ___

5) 6.298 - 1.79 = ___

6) 4.719 - 2.108 = ___

7) 4.407 - 3.106 = ___

8) 6.105 - 3.004 = ___

9) 8.10 - 1.10 = ___

10) 3.605 - 3.203 = ___

11) ___ = 5.436 - 2.42

12) ___ = 6.718 - 3.13

13) ___ = 5.574 - 1.27

14) ___ = 7.203 - 1.20

Column Subtraction

1) **53,600 - 37,678 = ?**

Step 1

		5	9	
5	3	6	10	10
- 3	7	6	7	8

Step 2

		2	15	9
5	3	6	10	10
- 3	7	6	7	8
			9	2	2

Step 3

	4	12	15	9
5	3	6	10	10
- 3	7	6	7	8
	1	5,	9	2	2

Strategy Applied

Step 1

In the **1s** column, 0 subtract 8, you cannot do as 0 is a **lower value** than 8.
From the **10s** column, **exchange/regroup** 1 **ten** from the 0 **tens,** you cannot do this as the value of the **tens** is zero.
Instead **exchange/regroup** 1 **hundred** from the 6 **hundreds** in the **100s** column to the **10s** column.
Cross out the 6 **hundreds** and write 5 **hundreds** above, then write the **exchanged/regrouped** 1 **hundred** next to the 0 **tens** to make 10 tens.
Still in the **10s** column**, regroup** 1 **ten** into 10 **ones** from the **10s** column to the **1s** column.
Cross out the 10 **tens** and write 9 **tens** above, then write the **exchanged/regrouped** 1 **ten** next to the 0 **ones** to make 10 ones.

Step 2

In the **1s** column, 10 subtract 8, equals 2 **ones** (2).
Write 2 in the **total value** of the **1s** column.
In the **10s** column, 9 subtract 7, equals 2 **tens** (20).
Write 2 in the **total value** of the **10s** column.
In the **100s** column, 5 subtract 6, you can't do as 5 is a **lower value** than 6.
Exchange/Regroup 1 **thousand** into 10 **hundreds** from the **1,000s** column to the **100s** column.
Cross out the 3 **thousands** and write 2 **thousands** above, then write the

exchanged/regrouped 1 thousand next to the **5 hundreds** to make **15 tens.**
In the **100s column**, **15** subtract 6, equals 9 **hundreds** (**900**).
Write **9** in the **total value** of the **100s** column.

Step 3
In the **1,000s** column, **2** subtract 7, you cannot do as **2** is a **lower value** than 7.
Exchange/Regroup 1 ten thousand into **10 thousands** from the **10,000s** column to the **1,000s** column.
Cross out the 5 **ten thousands** and write **4 ten thousands** above, then write the **exchanged/regrouped 1 ten thousand** next to the **2 thousands** to make **12 thousands**.
In the **1,000s** column, **12** subtract 7, equals 5 **thousands** (**5,000**).
Write **5** in the **total value** of the **1,000s** column.
In the **10,000s** column, **4** subtract 3, equals 1 **ten thousand** (**10,000**).
Write **1** in the **total value** of the **10,000s** column. **Total value** is **15.922**.

Test Questions

1)	5	3	6	0	0	2)	6	6	7	0	0	3)	2	3	5	0	0
-	3	7	6	7	8	-	3	6	8	0	5	-	2	1	0	0	6
4)	8	3	0	9	7	5)	3	6	3	4	2	6)	4	5	6	7	9
-	5	4	1	6	3	-	2	7	8	3	8	-	2	7	7	3	5
7)	5	9	2	0	2	8)	9	8	3	0	7	9)	9	0	1	0	4
-	2	7	8	9	0	-	2	7	6	9	0	-	5	5	5	5	5

Column Subtraction with Decimals

1) 7 9 . 5 6 9 - 3 4 . 6 2 4 = ?

Step 1

7	9	.	5	6	9
3	4	.	6	2	4
				4	5

Step 2

		8			
7	9	.	15	6	9
- 3	4	.	6	2	4
		.	9	4	5

Step 3

		8			
7	9	.	15	6	9
- 3	4	.	6	2	4
4	4	.	9	4	5

Strategy Applied

Step 1

In the **1,000ths** column, **9** subtract 4, equals 5 **thousandths** (**0.005**).
Write **5** in the **total value** of the **1,000ths** column.
In the **100ths** column, **6** subtract 2, equals 4 **hundredths** (**0.04**).
Write **4** in the **total value** of the **100ths** column.

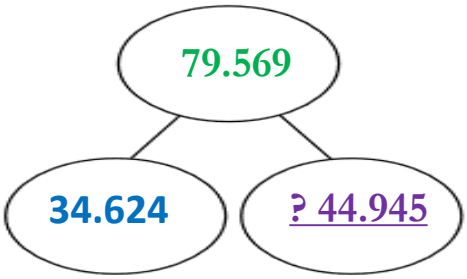
Step 2

In the **10ths** column, 5 subtract 6, you can't do as 5 is a **lower value** than 6 **Exchange/Regroup** 1 **one** into 10 **tenths** from the **1s column** to the **10ths** column.
Cross out the 9 **ones** and write **8** **ones** above, then write the **exchanged/ regrouped** **1** **one** next to the 5 **tenths** to make **1**5 tenths.
In the **10ths** column, **1**5 subtract 6, equals 9 **tenths** (**0.9**).
Write **9** in the **total value** of the **10ths** column.

Step 3

In the **1s** column, **8** subtract 4, equals 4 **ones** (**4**).
Write **4** in the **total value** of the **1s** column.
In the **10s** column, 7 subtract 3, equals 4 **tens** (**40**).
Write **4** in the **total value** of the **10s** column.
Total value is **44.945**.

Part Whole Model



Bar Model

79.569	
34.624	? 44.945

Test Questions

1) 79.569 − 34.624 =

2) 45.755 − 26.866 =

3) 69.37 − 45.42 =

4) 95.756 − 46.539 =

5) 67.977 − 48.355 =

6) 56.89 − 39.44 =

7) 84.075 − 56.965 =

8) 73.000 − 44.899 =

9) 75.08 − 65.35 =

10) 80.490 − 56.863 =

11) 60.644 − 48.788 =

12) 90.58 − 63.55 =

Find the Missing Number

1) **3,200m** - **1.65km** = **?**

Word Problem

Desmond drove **one point six five** **fewer** business kilometres this week than last week's **three thousand, two hundred** business kilometres. How many kms did she drive this week**?**

Strategy Applied

Step 1

First, the units of measure are **m** = **metres** and **km** = **kilometres**
As the units of measure are not the same, convert both numbers into either metres or kilometres.
1,000 **metres** = 1 **kilometre**. or 1 **kilometre** = 1,000 **metres**.

Step 2

Then, convert **3,200m** into kilometres by performing the following calculation **3,200** ÷ 1,000 = **3.2km**
OR
Next, convert **1.65km** into metres by performing the following calculation
1.65km x 1,000 = **1,650m**

Step 3

Then, choose to perform one of the following two calculations to find the missing number as follows.

3,200m - **1650m** = **?**

```
  2  11
  3  2 10  0
- 1  6  5  0
-------------
  1, 5  5  0  m
```

3.2km - **1.65km** = **?**

```
  2     11
  3  .  2 10
- 1  .  6  5
-------------
  1  .  5  5  km
```

Test Questions

1) 3,200m - 1.65km = ___

2) £72 - £14.38 = ___

3) ___ - 475 = 9,760

4) ___ - 4,632 = 9,511

5) 357 = 457 - ___

6) 100 - ___ = 30

7) ___ = 4,650 - 1,000

8) 200,900 - 1,000 - 1,000 = ___

9) 301,301 - 1,000 - 1,000 = ___

10) Subtract three thousand, six hundred and one from four thousand and eighty five = ___

11) Subtract one hundred and five from three hundred and forty two = ___

12) 402,900 - 2,000 - 2,000 = ___

13) 501,900 - 3,000 - 3,000 = ___

14) 720,800 - 4,000 - 4,000 = ___

Multiples of 10

1) 40 x 5 = ?

Word Problem

Pieces of wood are cut into **forty** centimetre lengths.
What is the **total** length of **5** pieces of wood**?**

Strategy Applied

The **forty** **represents** the **value** of each group, the **multiplicand**.
The **five** **represents** how many **groups of** **forty's** there are, the **multiplier**
The **?** **represents** the **total value** of **five** **groups of** **forty**, the **product**.

Method 1

Forty represents the value of **four** **multiples of** **ten**, 4 x 10, the **multiplicand**.
First, multiply the value of **four** by the **multiplier** **five**, equal to **twenty**.
Then, multiply the value of **ten** by **twenty**, equal to **two hundred**.

Step 1
4 x 5 = 20

Step 2
10 x 20 = 200

Method 2

Step Count **five** **lots of** **forty**, **adding on** one at a time, expressing each of the **number values** as they are **counted on**.
First, find and touch the number **forty** on a number grid and then count on another **forty** four more times, **80**, **120**, **160**, **200**.

Step Counting

40 → 80 → 120 → 160 → 200

Bar Model

40	40	40	40	40
? 200				

Number Grid

0	10	20	30	40 →	50	60	70	80 →	90	100
110	120 →	130	140	150	160 →	170	180	190 →	200	210

Test Questions

1) 40 x 5 = ___

2) 40 x 7 = ___

3) 50 x 8 = ___

4) 60 x 8 = ___

5) 70 x 8 = ___

6) 6 x 120 = ___

7) 3 x 110 = ___

8) 3 x 120 = ___

9) 4 x 110 = ___

10) 4 x 120 = ___

11) ___ = 210 x 2

12) ___ = 240 x 3

13) ___ = 320 x 4

14) ___ = 410 x 5

Multiples of 10

1) 60 x 40 = ?

Word Problem

A fleet of **sixty** brand new train carriages, can seat **forty** persons each.
How many persons in **total** can the whole fleet seat?

Strategy Applied

The **sixty** **represents** the **value** of each group, the **multiplicand**.
The **forty** **represents** how many **groups of** **sixty's** there are, the **multiplier**.
The **?** **represents** the **total value** of **forty** **groups of** **sixty**, the **product**.

Step 1	Step 2	Step 3
60 = 6 x 10	6 x 4 = 24	24 x 100 = 2,400
40 = 4 x 10	10 x 10 = 100	

Step 1

Sixty represents the value of **six** **multiples of** **ten**, 6 x 10, the **multiplicand**.
Forty represents the value of **four** **multiples of** **ten**, 4 x 10, the **multiplier**.

Step 2

First, multiply the value of **six** by **four** (**multiplier**), equal to **twenty four**.
Then, multiply the value of **ten** by **ten** (**multiplier**), equal to **one hundred**.

Step 3

Next, multiply the products of **twenty four** and **one hundred**, equal to **two thousand, four hundred**.

Test Questions

1) 60 x 40 = ___

2) 60 x 90 = ___

3) 50 x 80 = ___

4) 50 x 70 = ___

5) 50 x 60 = ___

6) 40 x 80 = ___

7) 30 x 70 = ___

8) 70 x 80 = ___

9) 70 x 70 = ___

10) 90 x 90 = ___

11) ___ = 110 x 10

12) ___ = 120 x 20

13) ___ = 210 x 30

14) ___ = 220 x 40

x10, x100 and x1,000

Multiply the value below first by **x10**, then by **x100**, next by **x1,000** and write down the **answers consecutively**.

1) **2.13** = ___ ___ ___

Place Value Grid

1,000s	100s	10s	1s		10ths	100ths	
			2	.	1	3	Value
		2	1	.	3		x10
	2	1	3	.			x100
2	1	3	0	.			x1000

Strategy Applied

Method 1

Multiply any **value** by **ten**, means that value will become **ten times as big**.
Each **digit** in the value will move **one column place value** to the **left**, starting with the **greatest place value**, the **1s**.

Method 2

Multiply any **value** by **one hundred**, means that value will become **one hundred times as big**.
Each **digit** in the **value** will move **two column place values** to the **left**. starting with the **greatest place value**, the **1s**.

Method 3

Multiply any **value** by **one thousand**, means that value will become **one thousand times as big**.
Each **digit** in the value will move **three column place values** to the **left**. starting with the **greatest place value**, the **1s**.

Finally **2.13** multiplied by **x10**, **x100**, **x1,000** = **21.3**, **213**, **2,130**.
When the place value is **blank**, write **zero**, a **place holder**.

Multiply each value below first by **x10**, then by **x100**, next by **x1,000** and write down the **answers consecutively**.

Test Questions

1) 2.13

2) 25.7

3) 632.4

4) 7.54

5) 62.9

6) 471.9

7) 4.47

8) 61.5

9) 810.2

10) 3.605

11) 54.36

12) 671.8

13) 5.574

14) 72.03

15) 613.9

Indices

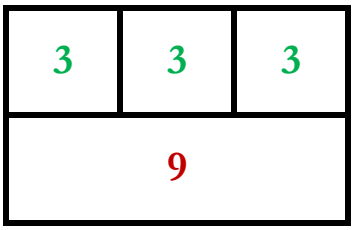
1) $3^2 + 2^3 = ?$

Strategy Applied

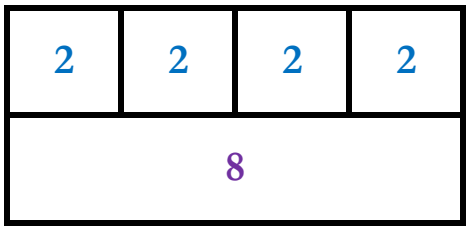
3^2 represents **three squared,** it's **expanded form** is three times three,
3 x 3

2^3 represents **two cubed**, it's **expanded form** is two times two times two,
2 x 2 x 2

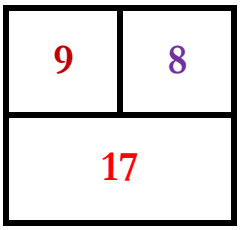
Step 1



Step 2



Step 3



Step 1
Use **known facts** of times tables or step counting to calculate **three squared**.
Calculate 3^2 or 3 x 3 or 3 **lots of** 3, equals the **product** of **nine**.

Step 2
Use **known facts** of times tables or step counting to calculate **two cubed**.
Calculate 2^3 or 2 x 2 x 2 or 2 **lots of** 2 **doubled,** equals the **product** **eight**.

Step 3
Add the **products** of **nine** and **eight**, equal to **seventeen**.

Test Questions

1) $3^2 + 2^3 =$ ___

2) $4^2 + 2^3 =$ ___

3) $2^2 + 3^2$ ___

4) $3^2 + 4^2$ ___

5) $3^2 + 3^3 =$ ___

6) $4^2 + 4^3 =$ ___

7) $5^2 + 6^2$ ___

8) $5^2 + 7^2$ ___

9) $8^2 + 5^3 =$ ___

10) $9^2 + 5^3 =$ ___

11) $2^3 + 10^3$ ___

12) $2^3 + 5^3$ ___

13) $11^2 + 2^3 =$ ___

14) $10^2 + 2^3 =$ ___

Short Multiplication

1) 1 7 3 8 4 6 x 2 = ?

Step 1

1	7	3	8	4	6	
					2	x
				9	2	=
				1		

Step 2

	1	7	3	8	4	6
x						2
			7,	6	9	2
			1		1	

Step 3

	1	7	3	8	4	6
x						2
	3	4	7,	6	9	2
	1		1		1	

Strategy Applied

Step 1

In the **1s** column, multiply **6** by **2** , equals 12 **ones** (**10** + **2**).
Write **2** in the **total value** of the **1s** column.
Exchange/Regroup the **10** **ones** into **1** **ten** from the **1s** column to the **10s** column and write **1** below the **total value line** of the **10s** column.
In the **10s** column, multiply (40) **4** by **2**, equals 8 **tens** (**80**).
Add the **exchanged/regrouped** **1** **ten** (10) below, equals 9 **tens** (**90**).
Write **9** in the **total value** of the **10s** column**.**

Step 2

In the **100s** column, multiply (800) **8** by **2**, equals **16** **hundreds** (**1,000** + **600**).
Write **6** in the **total value** of the **100s** column.
Regroup the **10** **hundreds** into **1** **thousand** from the **100s** column to the **1,000s** column and write **1** below the **total value line** of the **1,000s** column
In the **1,000s** column, multiply (3,000) **3** by **2**, equals **6** **thousands** (**6,000**).
Add the **exchanged/regrouped** **1** **thousand** (1,000) below, equals 7 **thousands** (**7,000**).
Write **7** in the **total value** of the **1,000s** column**.**

Step 3

In the **10,000s** column, multiply (70,000) **7** by **2**, equals **14** **ten thousands** (**10,000** + **4,000**).

Write **4** in the **total value** of the **10,000s** column.

Exchange/Regroup the **10** **ten thousands** into **1** **hundred thousand** from the **10,000s** column to the **100,000s** column and write **1** below the **total value line** of the **100,000s** column.

In the **100,000s** column, multiply (100,000) **1** by **2**, equals **2** **hundred thousands** (**200,000**).

Add the **exchanged/regrouped** **1** **hundred thousand** (1,000) below, equals 3 **hundred thousands** (**300,000**).

Write **3** in the **total value** of the **100,000s** column**.**

Total value is **347,692**.

Test Questions

1) 1 3 2 1 4 6
x 2

2) 2 1 0 5 3 7
x 3

3) 3 1 0 6 5 3
x 4

4) 4 3 0 0 2 5
x 5

5) 5 2 0 8 6 9
x 6

6) 6 1 3 9 1 2
x 7

7) 7 2 4 5 7 1
x 8

8) 8 2 1 6 0 7
x 9

Short Multiplication with Decimals

1) 1 3 . 0 4 6 x 5 = ?

Word Problem

Each paddling pool can hold **thirteen point two four six** litres of water.
How many litres of water held in **five** pools?

Step 1

```
 1 3 . 0 4 6
         5
-----------
     .   0
-----------
       3
```

Step 2

```
 1 3 . 0 4 6
         5
-----------
     . 2 3 0
-----------
     2 3
```

Step 3

```
 1 3 . 0 4 6
         5
-----------
 6 5 . 2 3 0
-----------
 1     2 3
```

Strategy Applied

Step 1

In the **1,000ths** column, multiply **6** by **5** , **equals** 30 **thousandths** (**0.03** + **0.000**).
Write **0** in the **total value** of the **1,000ths** column.
Exchange/Regroup the **30 thousandths** into **3 hundredths** from the **1000ths** column to the **100ths** column and write **3** below the **total value line** of the **100ths** column.

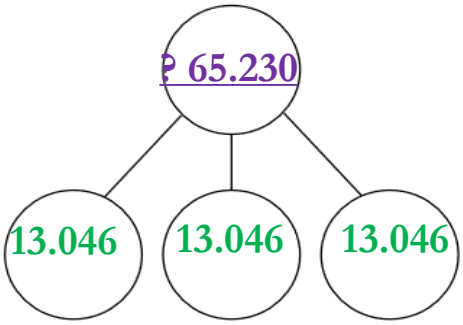
Step 2

In the **100ths** column, multiply **4** by **5**, equals 20 **hundredths** (**0.2** + **0.00**).
Add the **exchanged/regrouped 3 hundredths** below, is equal to 23 **hundredths** (**0.2** + **0.03**).
Write **3** in the **total value** of the **100ths** column.
Exchange/Regroup the **20 hundredths** into **2 tenths** from the **100ths** column to the **10ths** column and write **2** below the **total value line** of the **10ths** column. In the **10ths** column, multiply **0** by **5**, equals 0 **tenths** (**0.0**).
Add the **exchanged/regrouped 2 tenths** below, equals 2 **tenths** (**0.2**).
Write **2** in the **total value** of the **10ths** column.

Step 3

In the **1s** column, multiply **3** by **5**, equals 15 **ones** (**10** + **5**).
Write **5** in the **total value** of the **1s** column.
Exchange/Regroup the **10** **ones** into **1** **ten** from the **1s** column to the **10s** column and write **1** below the **total value line** of the **10s** column.
In the **10s** column, multiply **1** by **5**, equals 5 **tens** (**50**).
Add the **exchanged/regrouped** **1** **ten** below, equals 6 **tens** (**60**).
Write **6** in the **total value** of the **10s** column.
Total value is **65.230**.

Part Whole Model



Bar Model

13.046	13.046	13.046
? 65.230		

Test Questions

1) 13.246 x 5 =

2) 32.432 x 9 =

3) 4.328 x 8 =

4) 72.249 x 6 =

5) 53.458 x 5 =

6) 5.527 x 7 =

7) 93.356 x 7 =

8) 24.525 x 6 =

9) 86.235 x 5 =

Long Multiplication

1) 1 3 7 x 2 4 = ?

Step 1-3

	1	3	7
x		2	4
	5_1	4_2	8

Step 4-7

		1	3	7
x			2	4
		5_1	4_2	8
+	2	7_1	4	0

Step 8

		1	3	7
x			2	4
		5_1	4_2	8
+	2	7_1	4	0
	3,	2	8	8
	1			

Strategy Applied

Step 1 (First line of working out)

In the **1s** column, 7 x 4, equals 28 **ones** (**20** + **8**).

Write **8** underneath the 4 in the **1s** column.

Regroup the **20** **ones** into **2** **tens** and write it as a **small** 2 below the 2 in the **10s** column.

Step 2

In the **10s** column, (30) **3** x 4, equals 12 **tens** (**100** + **20**).

Add the **regrouped** 2 **tens** to the 12 **tens**, equals 14 **tens** (**100** + **40**).

Write **4** next to the **small** 2 in the **10s** column.

Regroup the **10** **tens** into **1** **hundred** and write a **small** 1 below the **1** in the **100s** column.

Step 3

In the **100s** column, (100) **1** x 4, equals 4 **hundreds** (**400**).

Add the **regrouped** 1 **hundred** to the 4 **hundreds**, equals 5 **hundreds** (**500**).

Write **5** next to the **small** 1 in the **100s** column.

Step 4 (Second line of working out)

In the **1s** column, write **0** below the **8**, a **place holder**, to **represent** the **tens place value** of the **2** **tens** in the number **24**, the **multiplier**. (Discuss)

Step 5

In the **1s** column, **7** x **2** (20), equals 14 **tens** (**100** + **40**).
Write **4** below the **4** in the **10s** column.
Regroup the **10** **tens** into **1** **hundred**.
Write a **small** **1** below the **5** in the **100s** column.

Step 6

In the **10s** column, (30) **3** x **2** (20), equals 6 **hundreds** (**600**).
Add the **regrouped** **1** **hundred** to the 6 **hundreds**, equals 7 **hundreds** (**700**).
Write **7** below the **5** in the **100s** column.

Step 7

In the **100s** column, (100) **1** x **2** (20), equals 2 **thousands** (**2,000**).
Write **2** in the **1,000s** column.

Step 8 (Third line of working out)

Use **column addition** to add together the two lines of working out, do not include the **small regrouped** values.
Total value is **3,288**.

Test Questions

1)	8	3	
x	2	4	
+			

2)	1	3	7
x		2	4
+			

3)	5	4	7	8
x			2	8
+				

4)	9	4	
x	2	6	
+			

5)	4	5	8
x		3	6
+			

6)	6	7	5	7
x			4	9
+				

Find the Missing Number

1) £2.75 x ? = £35.00 - £7.50

Word Problem

A packet of peanuts cost **two pounds seventy five** each.
A family size bag of cashew nuts is on sale, **seven pounds fifty cheaper than** the usual price of **thirty five pounds**.
How many packets of peanuts cost the same as the bag of cashew nuts?

Strategy Applied

Step 1

Calculate the **known number sentence** £35.00 - £7.50, using **column subtraction**.

$$\begin{array}{rr} & 2\ 14 \\ & 3\ 5\ .\ {}^{1}0\ 0 \\ - & 7\ .\ 5\ 0 \\ \hline & 2\ 7\ .\ 5\ 0 \\ \hline \end{array}$$

Step 2

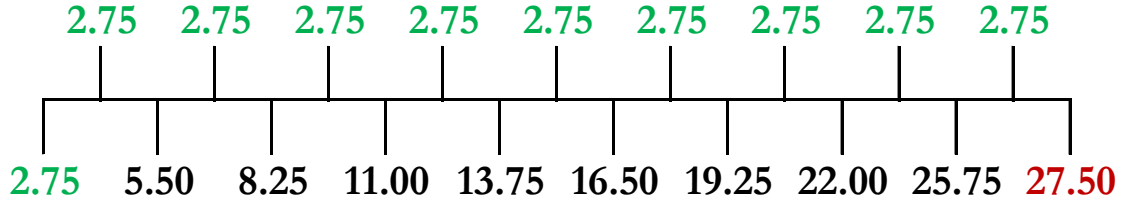
New **known fact** £2.75 x ? = £27.50
Use **step counting** to count on in **lots of** £2.75 up to £27.50
How many lots of £2.75 are counted on is the missing number, 10.

Step Counting

2.75 5.50 8.25 11.00 13.75 16.50 19.25 22.00 25.75 27.50

● ● ● ● ● ● ● ● ● ●

Number Line



Test Questions

1) £2.75 x ___ = £35.00 - £7.50

2) £4.75 x ___ = £65.00 - £17.50

3) 60 x 40 = ___ x 30

4) 617 x 9 = ___ + 1,860

5) 4 x 4 x 4 = ___

6) 6 x 8 = ___ x 4

7) 8 x ___ = 96

8) 6 x 7 x 4 = ___

9) 506 x 7 = ___ + 1,753

10) 18 x 0 x 8 = ___

11) 7 x ___ = 63

12) 3 x 7 x 8 = ___

13) 2,106 x 3 = ___ + 2,453

14) 15 x 0 x 6 = ___

Multiples of 10

1) 3 3 0 ÷ 3 = ?

Word Problem

A stack of multilink cubes reach a height of 330cm.
Each multilink cube is 3cm tall.
How many multilink cubes are in the stack?

Strategy Applied

Three hundred and thirty represents the **total value**, the **dividend**.
Three represents how many **groups** the three hundred and thirty is equally divided into, the **divisor**.
? represents the **value** of each group, the **quotient.**

Step 1

3 3 0 = 3 3 x 1 0

Step 2

3 3 ÷ 3 = 1 1

Step 3

1 0 x 1 1 = 1 1 0

Step 1

First, three hundred and thirty represents the **value** of thirty three **multiples of** ten, 33 x 10, the **dividend**.

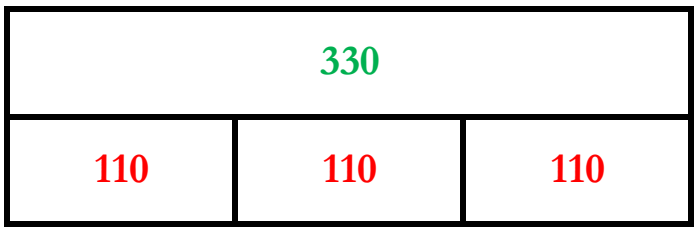
Step 2

Then, **divide** the value of thirty three by three (**divisor**), equal to eleven.

Step 3

Next, **multiply** the value of ten by eleven, equal to one hundred and ten.
Finally, three hundred and thirty divided by three is equal to one hundred and ten.

Bar Model



Test Questions

1) 330 ÷ 3 = ___

2) 360 ÷ 4 = ___

3) 350 ÷ 5 = ___

4) 360 ÷ 6 = ___

5) 420 ÷ 7 = ___

6) 320 ÷ 8 = ___

7) 360 ÷ 9 = ___

8) 240 ÷ 3 = ___

9) 240 ÷ 4 = ___

10) 250 ÷ 5 = ___

11) 630 ÷ 9 = ___

12) 270 ÷ 3 = ___

13) 480 ÷ 4 = ___

14) 600 ÷ 5 = ___

Multiples of 10

1) 4, 2 0 0 ÷ 7 0 = ?

Strategy Applied

How many **seventy** seater aeroplanes are needed to carry **four thousand, two hundred** holiday makers**?**

Strategy Applied

Four thousand, two hundred represents the **total value**, the **dividend**.
Seventy represents how many **groups** the **three hundred and thirty** is equally divided into, the **divisor**.
? represents the **value** of each group, the **quotient**.

Step 1

4 2 0 0 = 4 2 x 1 0 0
7 0 = 7 x 1 0

Step 2

4 2 ÷ 7 = 6
1 0 0 ÷ 1 0 = 1 0

Step 3

6 x 1 0 = 6 0

Step 1

Four thousand, two hundred represents the values of **forty two multiples of one hundred**, 42 x 100, the **dividend**.
Seventy represents the value of **seven multiples of ten**, 7 x 10, the **divisor**.

Step 2

First, divide the value of **forty two** by **seven**, equal to **six**.
Then, divide the value of **one hundred** by **ten**, equal to **ten**.

Step 3

Next, multiply **six** by **ten**, equal to **sixty**.
Finally, **four thousand, two hundred** divided by **seventy** is equal to **sixty**.

Test Questions

1) 4,200 ÷ 70 = ___

2) 4,800 ÷ 80 = ___

3) 3,500 ÷ 50 = ___

4) 5,500 ÷ 50 = ___

5) 4,500 ÷ 30 = ___

6) 4,800 ÷ 40 = ___

7) 1,500 ÷ 50 = ___

8) 4,200 ÷ 60 = ___

9) 7,200 ÷ 90 = ___

10) 4,000 ÷ 80 = ___

11) 5,500 ÷ 50 = ___

12) 5,400 ÷ 60 = ___

13) 8,100 ÷ 90 = ___

14) 9,600 ÷ 80 = ___

÷10, ÷100 and ÷1,000

Divide the **value** below first by **÷10**, then by **÷100**, next by **÷1,000** and write down all **three answers consecutively**.

1) 213 = ___ ___ ___

Place Value Grid

100s	10s	1s		10ths	100ths	1,000ths	
2	1	3	•				Value
	2	1	•	3			÷10
		2	•	1	3		÷100
		0	•	2	1	3	÷1,000

Strategy Applied

Method 1

Divide any **value** by **ten**, means that value will become **ten times as small**.

Each **digit** in the value will move **one column place value** to the **right**, starting with the **greatest place value**, the **100s**.

Method 2

Divide any **value** by **one hundred**, means that number will become **one hundred times as small**.

Each **digit** in the number will move **two column place values** to the **right**, starting with the **greatest place value**, the **100s**.

Method 3

Divide any number by **one thousand**, means that number will become **one thousand times as small as**.

Each **digit** in the number will move **three column place values** to the **right**, starting with the **greatest place value**, the **100s**.

Finally **213** multiplied by **÷10**, **÷100** and **÷1,000** = **2.13**, **2.13**, **0.213**.

When the place value is **blank**, write **zero**, a **place holder**.

Divide the values below first by **÷10**, then by **÷100**, next by **÷1,000** and write down all **three answers consecutively**.

Test Questions

1) 213

2) 257

3) 6,324

4) 75

5) 62

6) 4719

7) 4

8) 6

9) 8,102

10) 605

11) 54,306

12) 6,718

13) 55,074

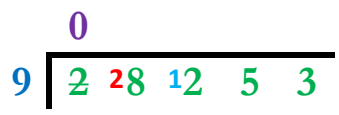
14) 7,203

15) 60,139

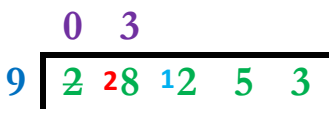
Short Division

1) 28,253 ÷ 9 = ?

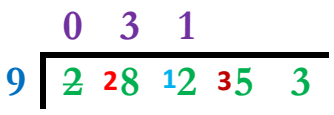
Step 1



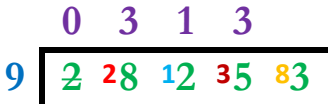
Step 2



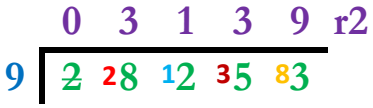
Step 3



Step 4



Step 5



Strategy Applied

Step 1

How many **lots of** 9 divide **exactly** in to 2? The answer is 0 (9 x 0 = 0), with a **remainder** of 2 .

Write 0 on the line above the 2.

Cross out the 2 and **regroup** the **remainder** 2 to the next **digit place value**,8.

Step 2

How many **lots of** 9 divide **exactly** in to 28? The answer is 3 (9 x 3 = 27), with a **remainder** of 1.

Write 3 on the line above the 28.

Regroup the **remainder** 1 to the next **digit place value**, 2, to become 12.

Step 3

How many **lots of** 9 divide **exactly** in to 12? The answer is 1 (9 x 1 = 9), with a **remainder** of 3.

Write 1 on the line above the 12.

Regroup the **remainder** 3 to the next **digit place value**, 5, to become 35.

Step 4

How many **lots of** 9 divide **exactly** in to 35? The answer is 3 (9 x 3 = 27), with a **remainder** of 8.
Write 3 on the line above the 35.

Step 5

How many **lots of** 9 divide **exactly** in to 83? The answer is 9 (9 x 9 = 81), with a **remainder** of 2.
Write 9 on the line above the 83.
The **remainder** of 2, is written as **r2** on the line above.
Total value is **3,139 r2**.

Test Questions

1) 28,253 ÷ 9 = ___

2) 15,643 ÷ 9 = ___

3) 35,840 ÷ 8 = ___

4) 12,688 ÷ 8 = ___

5) 24,571 ÷ 7 = ___

6) 15,789 ÷ 7 = ___

7) 24,854 ÷ 6 = ___

8) 35,058 ÷ 6 = ___

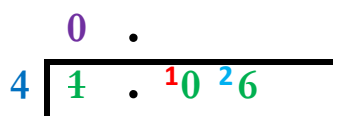
9) 35,008 ÷ 4 = ___

10) 79,036 ÷ 4 = ___

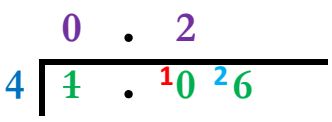
Short Division with Decimals

1) 1.060 ÷ 4 = ?

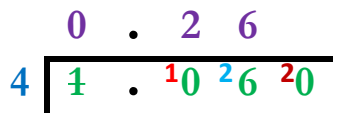
Step 1



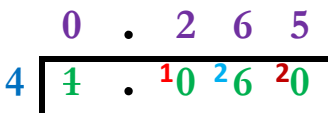
Step 2



Step 3



Step 4



Strategy Applied

Step 1

How many **lots of** 4 divide **exactly** in to 1? The answer is 0 (2 x 0 = 0), with a **remainder** of 1.
Write 0 on the line above the 1 and write a **decimal point** next to it.
Cross out the 1 and **regroup** the **remainder** 1 to the next **digit place value**, 0, to become 10.

Step 2

How many **lots of** 4 divide **exactly** in to 10? The answer is 2 (4 x 2 = 8), with a **remainder** of 2 .
Write 2 on the line above the 10.
Regroup the **remainder** 2 to the next **digit place value**, 6, to become 26.

Step 3

How many **lots of** 4 divide **exactly** in to 26? The answer is 6 (4 x 6 = 24), with a **remainder** of 2.
Write 6 on the line above the 26.
Regroup the **remainder** 2 to the next **digit place value**, by writing a **place holder, zero**, to become 20.

Step 4

How many **lots of** 4 divide **exactly** in to 20? The answer is 5 (4 x 5 = 20), Write 5 on the line above the 20.

Step 5

There are no more **digits** in the number to be divided by 4.
Total value is 0.265.

Test Questions

1) 1.06 ÷ 4 = ___

2) 5.54 ÷ 4 = ___

3) 3.66 ÷ 6 = ___

4) 7.38 ÷ 6 = ___

5) 9.18 ÷ 3 = ___

6) 2.895 ÷ 3 = ___

7) 1.057 ÷ 7 = ___

8) 5.77 ÷ 7 = ___

9) 4.32 ÷ 8 = ___

10) 7.456 ÷ 8 = ___

Find the Missing Number

1) 3,500 ÷ 50 + 150 = ?

Word Problem

Fifty libraries **share** a donation of **three thousand, five hundred** dictionaries from a charity. Another charity **gives** one of the libraries an **extra one hundred and fifty** dictionaries.
How many dictionaries did that library receive **altogether?**

Strategy Applied

There are two **operations** in the number sentence, **divide** and **add**.
First, calculate 3,500 ÷ 50 and then add 150

Step 1

$$\begin{array}{r} 0\ 0\ 7\ 0 \\ 50\overline{)\ 3\ 3\ 5\ 0\ 0} \end{array}$$

Step 2

$$\begin{array}{r} 1\ 5\ 0 \\ +\quad 7\ 0 \\ \hline 2\ 2\ 0 \\ \hline 1 \end{array}$$

Step 1

Then, use a mental strategy or short division to calculate
3,500 ÷ 50 , which is equal to 70

Step 2

Next, use a mental strategy or column addition to calculate
70 + 150 , which is equal to 220

Test Questions .

1) 3,500 ÷ 50 + 150 =

2) 100 - 60 ÷ 4 + 9 = ___

3) 3,200 ÷ 8 + 120 = ___

4) 3,200 ÷ 40 + 400 = ___

5) 3,600 ÷ 9 + 40 = ___

6) 3,600 ÷ 4 + 90 = ___

7) 40 - 36 ÷ 3 + 5 = ___

8) 180 - 78 ÷ 2 + 4 = ___

9) 12 + 7 x 4 ÷ 4 = ___

10) 100 - 26 ÷ 2 + 8 = ___

11) 320 ÷ 8 + 15 = ___

12) 4,800 ÷ 40 + 25 = ___

13) 360 ÷ 9 + 35 = ___

14) 360 ÷ 6 + 45 = ___

To Nearest 10,000

1) **5, 4 6 9, 1 0 9 = ?**

Strategy Applied

When rounding to the nearest **10,000s** place value, the following will occur.
1. The **10,000s digit value** will remain the **same** (round down), if the digit in the **1,000s** column is a 0, 1, 2, 3, 4 (**4 or less**).
2. The **10,000s digit value** will increase by **one ten thousand** (round up), if the digit in the **1,000s** column is a 5, 6, 7, 8, 9 (**5 or more**).
3. The **value** of any digits in the **column place values** to the **right** of the **10,000s** column change to a **place holder**, **0**.
4. The **value** of any digits in the **column place values** to the **left** of the **10,000s** column usually remain the **same**. (If the **10,000s** digit value increases to 100,000 then the **10,000s** digit becomes a **place holder**, **0** and the **100,000s** digit increases by 100,000 more)

Place Value Grid

1,000,000s	100,000s	10,000s	1,000s	100s	10s	1s
5,	4	6	9,	1	0	9
5,	4	7	0,	0	0	0

Step 1

First, write the number **5,469,109** on a **Place Value Grid** in the correct column place values of the **1,000,000s**, **100,000s**, **10,000s**, **1,000s**, **100s**, **10s** and **1s**.

Step 2

Then, say the digit in the **1,000s** column which is **9** and as it is **5 or more** the **10,000s** digit value will increase by **one ten thousand** (round up).

Step 3

Next, the digit value of the **6** **ten thousands** (60,000), add **10,000** to make **7** **ten thousands** (70,000).
In the **10,000s** column write the digit **7** underneath the digit **6**.

Step 4

Then, the **1,000s**, **100s**, **10s** and **1s** column digit values change to a **place holder**, **0**.
In the **1,000s**, **100s**, **10s** and **1s** columns write the digit **0** underneath the digits **9**, **1**, **0** and **9**.

Step 5

Next, the **1,000,000s** and **100,000s** column digit values remains the **same** as **5** and **4**.
In the **1,000,000s** and **100,000s** columns write the same digits **5** and **4** underneath.

Step 6

Finally, **5,469,109** rounded to the **nearest 10,000** is **5,470,000**.

Test Questions

1) 5,469,109 = ___

2) 9,270,864 = ___

3) 9,878,135 = ___

4) 5,888,063 = ___

5) 2,173,639 = ___

6) 1,081,482 = ___

7) 1,043,068 = ___

8) 2,010,207 = ___

9) 3,870,671 = ___

10) 6,561,112 = ___

11) 6,320,849 = ___

12) 8,721,920 = ___

13) 9,087,451 = ___

14) 2,936,204 = ___

To Nearest 100,000

1) **5, 4 6 9, 1 0 9 = ?**

Strategy Applied

When rounding to the nearest **100,000s** place value, the following will occur.

1. The **100,000s digit value** will remain the **same** (round down), if the digit in the **10,000s** column is a 0, 1, 2, 3, 4 (**4 or less**).
2. The **100,000s digit value** will increase by **one hundred thousand** (round up), if the digit in the **10,000s** column is a 5, 6, 7, 8, 9 (**5 or more**).
3. The **value** of any digits in the **column place values** to the **right** of the **100,000s** column change to a **place holder**, **0**.
4. The **value** of any digits in the **column place values** to the **left** of the **100,000s** column usually remain the **same**. (If the **100,000s** digit value increases to 1,000,000 then the **100,000s** digit becomes a **place holder**, **0** and the **1,000,000s** digit increases by 1,000,000 more)

Place Value Grid

1,000,000s	100,000s	10,000s	1,000s	100s	10s	1s
5,	4	6	9,	1	0	9
5,	5	0	0,	0	0	0

Step 1

First, write the number **5,469,109** on a **Place Value Grid** in the correct column place values of the **1,000,000s**, **100,000s**, **10,000s**, **1,000s**, **100s**, **10s** and **1s**.

Step 2

Then, say the digit in the **10,000s** column which is **6** and as it is **5 or more** the **100,000s** digit value will increase by **one hundred thousand** (round up).

Step 3

Next, the digit value of the **4** **hundred thousand** (400,000), add **100,000** to make **5** **hundred thousand** (500,000).
In the **100,000s** column write the digit **5** underneath the digit **4**.

Step 4

Then, the **10,000**s, **1,000s**, **100s**, **10s** and **1s** column digit values change to a **place holder**, **0**.
In the **10,000s**, **1,000s**, **100s**, **10s** and **1s** columns write the digit **0** underneath the digits **6**, **9**, **1**, **0** and **9**.

Step 5

Next, the **1,000,000s** column digit value remains the **same** as **5**.
In the **1,000,000s** columns write the same digit **5** underneath.

Step 6

Finally, **5,469,109** rounded to the **nearest 10,000** is **5,500,000**.

Test Questions

1) 5,469,109 = ___

2) 9,270,864 = ___

3) 9,878,135 = ___

4) 5,888,063 = ___

5) 2,173,639 = ___

6) 1,081,482 = ___

7) 1,043,068 = ___

8) 2,010,207 = ___

9) 3,870,671 = ___

10) 6,561,112 = ___

11) 6,320,849 = ___

12) 8,721,920 = ___

13) 9,087,451 = ___

14) 2,936,204 = ___

To Nearest 1,000,000

1) **5, 4 6 9, 1 0 9 = ?**

Strategy Applied

When rounding to the nearest **1,000,000s** place value, the following will occur.

1. The **1,000,000s digit value** will remain the **same** (round down), if the digit in the **100,000s** column is a 0, 1, 2, 3, 4 (**4 or less**).
2. The **1,000,000s digit value** will increase by **one hundred thousand** (round up), if the digit in the **100,000s** column is a 5, 6, 7, 8, 9 (**5 or more**).
3. The **value** of any digits in the **column place values** to the **right** of the **1,000,000s** column change to a **place holder**, **0**.
4. The **value** of any digits in the **column place values** to the **left** of the **1,000,000s** column usually remain the **same**. (If the **1,000,000s** digit value increases to 10,000,000 then the **1,000,000s** digit becomes a **place holder**, **0** and the **10,000,000s** digit increases by 10,000,000 more)

Place Value Grid

1,000,000s	100,000s	10,000s	1,000s	100s	10s	1s
5,	4	6	9,	1	0	9
5,	0	0	0,	0	0	0

Step 1

First, write the number **5,469,109** on a **Place Value Grid** in the correct column place values of the **1,000,000s**, **100,000s**, **10,000s**, **1,000s**, **100s**, **10s** and **1s**.

Step 2

Then, say the digit in the **100,000s** column which is **4** and as it is **4 or less** the **1,000,000s** digit value will remain the **same** (round down).

Step 3

Next, the digit value of the **5 million** (5,000,000) remains the same.
In the **1,000,000s** column write the digit **5** underneath the digit **5**.

Step 4

Then, the **100,000s**, **10,000**s, **1,000s**, **100s**, **10s** and **1s** column digit values change to a **place holder**, **0**.
In the **100,000s**, **10,000s**, **1,000s**, **100s**, **10s** and **1s** columns write the digit **0** underneath the digits **4**, **6**, **9**, **1**, **0** and **9**.

Step 6

Finally, **5,469,109** rounded to the **nearest 10,000** is **5,000,000**.

Test Questions

1) 5,469,109 = ___

2) 9,270,864 = ___

3) 6,878,135 = ___

4) 5,888,063 = ___

5) 2,173,639 = ___

6) 1,081,482 = ___

7) 1,043,068 = ___

8) 2,010,207 = ___

9) 3,870,671 = ___

10) 6,561,112 = ___

11) 6,320,849 = ___

12) 8,721,920 = ___

13) 9,087,451 = ___

14) 2,936,204 = ___

Percentage of a Quantity

1) 42% of 90 = ?

Strategy Applied

100% = Quantity of 90
10% = Quantity ÷ 10 (90 ÷ 10)
1% = Quantity ÷ 100 (90 ÷ 100)
Partition 42% into 40% + 2%

Step 1

1 0 % = 9 0 ÷ 1 0 = 9
4 0 % = **1 0 %** x 4 = 9 x 4 = 3 6

	10s	1s
value	9	0
÷ 10		9

$$\begin{array}{rr} & 9 \\ \times & 4 \\ \hline & 36 \\ \hline & 3 \end{array}$$

Calculate 40% of the **quantity** of 90.
First, work out **10%** of the **quantity** of 90, equal to 9.
Then, 40% is equal to **10%** multiplied by 4, equal to the **quantity** of 36.

Step 2

1 % = 9 0 ÷ 1 0 0 = 0 . 9
2 % = **1 %** x 2 = 0 . 9 x 2 = 1 . 8

	10s	1s		10ths
value	9	0	.	
÷ 100		0	.	9

$$\begin{array}{rr} & 0.9 \\ \times & 2 \\ \hline & 1.8 \\ \hline & 1 \end{array}$$

Calculate 2% of the **quantity** of 90.
Next, work out **1%** of the **quantity** of 90, equal to **0.9**.
Then, 2% is equal to **1%** multiplied by 2, equal to the **quantity** of **1.8**.

Step 3

4 0 % + 2 % = 3 6 + 1 . 8 = 3 7 . 8

$$\begin{array}{r} 36.0 \\ +\ \ 1.8 \\ \hline 37.8 \\ \hline \end{array}$$

Calculate 42% of the **quantity** of 90.
Next, add together the quantities of **40%** and **2%**, which is **36** add **1.8**.
Finally, **42%** of the **quantity** of **90** is equal to **37.8**.

Test Questions

1) 42% of 90 = ___
2) 76% of 60 = ___
3) 75% of 66 = ___
4) 38% of 78 = ___
5) 91% of 60 = ___
6) 63% of 40 = ___
7) 55% of 46 = ___
8) 35% of 98 = ___
9) 71% of 80 = ___
10) 33% of 20 = ___
11) 12% of 950 = ___
12) 89% of 250 = ___
13) 98% of 240 = ___
14) 34% of 460 = ___

Fraction of a Quantity

1) $\frac{3}{5}$ **of** 2 **metres** = **?**

Word Problem

Emily has **two metres** of ribbon to decorate a present.
She only uses **three-fifths** of the ribbon.
How many metres of ribbon was used**?**

Strategy Applied

A fraction is part of a **whole** or part of **1** and a **fifth** is 1 of 5 **equal groups**
2 metres is the **quantity** divided **equally** between the **total number** of **groups**.
5 is the **denominator**, represents the **total** number of **groups**.
3 is the **numerator**, represents **three** of the **total** number of **groups**.

Step 1

$$5 \overline{)\, 2\,{}^{2}0\;\;0} \quad 0\;\;4\;\;0 \text{ cms}$$

Step 2

$$\begin{array}{r} 4\;\;0 \\ \times \quad\quad 3 \\ \hline 1\;\;2\;\;0 \text{ cms} \end{array}$$

1

Step 1

First, convert the quantity **2 metres** into **200 cms**, an equivalent unit of measure so that it can be divided more easily. (1 metre =100cms)
Then, use **short division** to calculate the value of **one equal group**, **two hundred cms** divided by **five** (denominator), equal to **forty cms**.

Step 2

Next, use **short multiplication** to calculate the value of **three equal groups**, **forty cms** times **three** (multiplier), equal to **one hundred and twenty cms**.
Finally, the **value** of the missing number is **120 cms**.

Bar Model

200cm				
40cm	40cm	40cm	40cm	40cm

Test Questions

1) $\frac{3}{5}$ of 2 metres = ___

2) $\frac{2}{3}$ of 63km = ___

3) $\frac{3}{7}$ of 2800m = ___

4) $\frac{1}{3}$ of £5.07 = ___

5) $\frac{3}{7}$ of 700 = ___

6) $\frac{5}{6}$ of 120 = ___

7) $\frac{3}{8}$ of £120 = ___

8) $\frac{1}{4}$ of 308 = ___

9) $\frac{1}{8}$ of £7.20 = ___

10) $\frac{4}{7}$ of £14 = ___

Add Fractions

1) $\frac{2}{3} + \frac{4}{5} = \frac{?}{?}$

Strategy Applied

Add fractions with **different denominators**, two-thirds and four-fifths.

2 is the **numerator**. $\frac{2}{}$ 4 is the **numerator**. $\frac{4}{}$

3 is the **denominator**. $\frac{}{3}$ 5 is the **denominator**. $\frac{}{5}$

Step 1

LCM = 15 = LCD

x 3	x 5
3	5
6	10
9	15
12	
15	

Step 2

$\frac{2}{3} \times 5 = \frac{10}{15}$

Step 3

$\frac{4}{5} \times 3 = \frac{12}{15}$

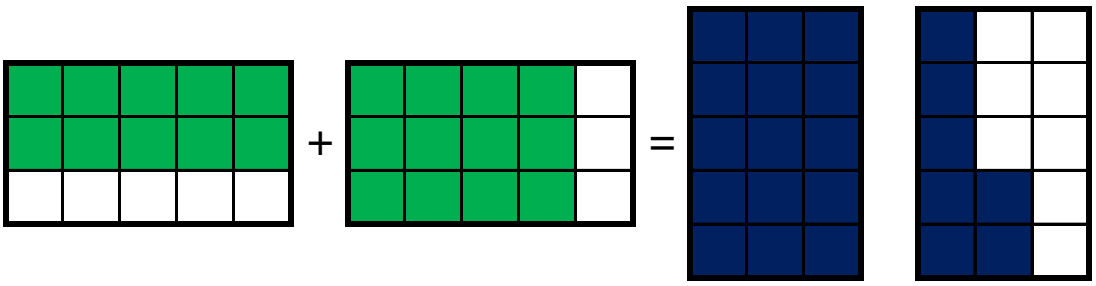
Step 4

$\frac{10}{15} + \frac{12}{15} = \frac{22}{15}$

Step 5

$$15\overline{)22} \quad 0 \text{ r } 22 \qquad \frac{22}{15} = 1\frac{7}{15}$$

Bar Model



$\frac{2}{3}$ or $\frac{10}{15}$ + $\frac{4}{5}$ or $\frac{12}{15}$ = $\frac{22}{15}$ or $1\frac{7}{15}$

Step 1

First, both fractions need to be made **equivalent**.

Calculate the **Lowest Common Multiple/Denominator** (**LCM/LCD**) of the denominators 3 and 5, which is 15.

Step 2

Then, for **two-thirds**, the **denominator 3** is multiplied by 5 to make it **equivalent** to **15** (**LCD**).

The **numerator 2** must also be multiplied by 5, equal to **10**.

Step 3

Next, for **four-fifths**, the **denominator 5** is multiplied by 3 to make it **equivalent** to **15** (**LCD**).

The **numerator 4** must also be multiplied by 3, equal to **12**.

Step 4

Then, add the **numerators 10** + **12**, equalling **22** and the **denominator** remains the **same** as **15**, making the fraction **twenty two-fifteenths**.

Step 5

Next, **twenty two-fifteenths** is an **improper fraction** and needs to be converted into a **mixed fraction**, using **short division**.

22 (numerator) is divided by **15** (denominator), which is **1** remainder **7**.

The **remainder 7** is written as a fraction, becoming the **numerator** and the **denominator** remains the **same**, **15**.

Finally, **total value** is **one** and **seven-fifteenths**. (Simplify if possible)

Test Questions

1) $\frac{2}{3} + \frac{4}{5} = \_\_\_$

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

3) $\frac{3}{4} + \frac{11}{12} = \_\_\_$

4) $\frac{1}{3} + \frac{5}{12} = \_\_\_$

5) $\frac{1}{4} + \frac{5}{6} = \_\_\_$

6) $\frac{1}{2} + \frac{1}{12} = \_\_\_$

7) $\frac{1}{4} + \frac{5}{8} = \_\_\_$

8) $\frac{2}{6} + \frac{7}{12} = \_\_\_$

9) $\frac{1}{5} + \frac{5}{15} = \_\_\_$

10) $\frac{2}{10} + \frac{7}{30} = \_\_\_$

Subtract Fractions

1) $\frac{2}{4} - \frac{1}{10} = \frac{?}{?}$

Strategy Applied

Subtract fractions of **different denominators**, **two-quarters** and **one-tenth**.

2 is the **numerator**. 4 is the **denominator**. $\frac{2}{4}$

1 is the **numerator**. 10 is the **denominator**. $\frac{1}{10}$

Step 1

LCM = 20 = LCD

x 4	x 10
4	10
8	20
12	
16	
20	

Step 2

$\frac{2}{4} \times 5 = \frac{10}{20}$

$\frac{4}{} \times 5 = \frac{}{20}$

Step 3

$\frac{1}{10} \times 2 = \frac{2}{20}$

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

Step 4

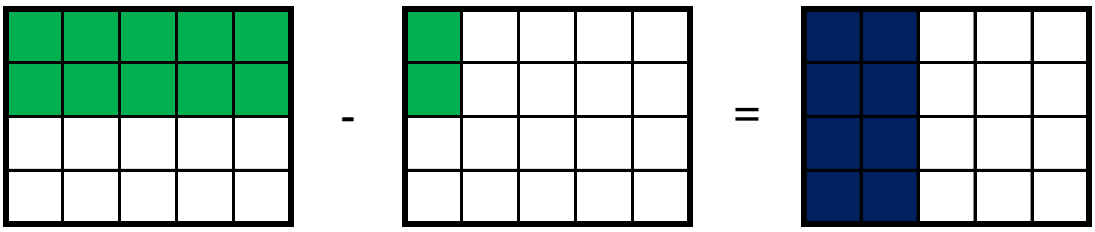
$\frac{10}{20} - \frac{2}{20} = \frac{8}{20}$

Step 5

$\frac{8}{20} \div 4 = \frac{2}{5}$

$\frac{20}{} \div 4 = \frac{}{5}$

Bar Model



$\frac{2}{4}$ or $\frac{10}{20}$ - $\frac{1}{10}$ or $\frac{2}{20}$ = $\frac{8}{20}$ or $\frac{2}{5}$

Step 1

First, both fractions need to be made **equivalent**.

Calculate the **Lowest Common Multiple/Denominator** (**LCM/LCD**) of the denominators 4 and 10, which is 20.

Step 2

Then, for **two-quarters**, the **denominator** **4** is multiplied by 5 to make it **equivalent** to **20** (**LCD**).

The **numerator** **2** must also multiplied by 5, equal to **10**.

Step 3

Next, for **one-tenth**, the **denominator** **10** is multiplied by 2 to make it **equivalent** to **20** (**LCD**).

The **numerator** **1** must also multiplied by 2, equal to **2**.

Step 4

Then, subtract the **numerators** **10** - **2**, equalling **8** and the **denominator** remains the **same** as **20**, making the fraction **eight-twentieths**.

Step 5

Next, **eight-twentieths** is a **proper fraction** that can be **simplified**.

Simplify the fraction, by dividing both the numerator and denominator by the same **Highest Common Factor** (**HCF**) of 4.

Then the **numerator** 8 is divided by 4, equal to **2** and the **denominator** **20** is divided by 4, equal to **5**.

Finally the **total value** is **eight-twentieths** or **one-quarter**.

Test Questions

1) $\frac{3}{4} - \frac{1}{10} = \_\_\_$

2) $\frac{3}{4} - \frac{3}{10} = \_\_\_$

3) $\frac{2}{3} - \frac{1}{12} = \_\_\_$

4) $\frac{2}{3} - \frac{1}{6} = \_\_\_$

5) $\frac{2}{3} - \frac{1}{9} = \_\_\_$

6) $\frac{2}{3} - \frac{2}{9} = \_\_\_$

7) $\frac{3}{4} - \frac{7}{10} = \_\_\_$

8) $\frac{2}{5} - \frac{2}{6} = \_\_\_$

9) $\frac{7}{12} - \frac{2}{6} = \_\_\_$

10) $\frac{2}{3} - \frac{4}{9} = \_\_\_$

Multiply Fractions

1) $\frac{5}{8} \times 2 = \frac{?}{}$

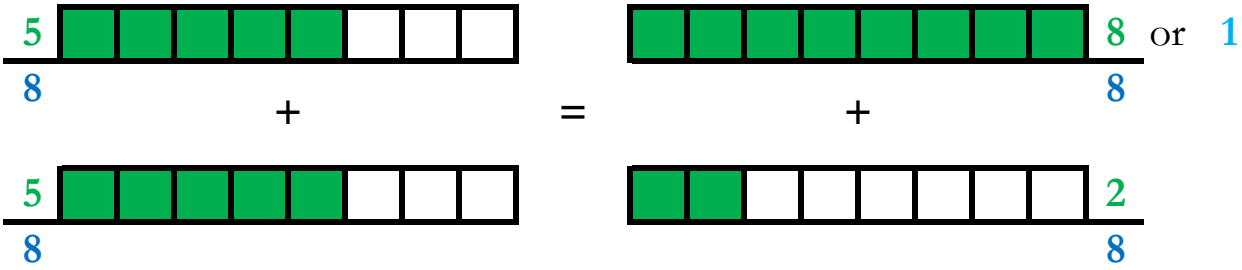
Strategy Applied

5 represents the **numerator**. $\frac{5}{8}$ 2 represents the **integer**.

8 represents the **denominator**.

$\frac{5}{8} \times 2$ means **two lots of five-eighths**. **or** $\frac{5}{8} + \frac{5}{8}$

Bar Model



$\frac{5}{8} + \frac{5}{8} = \frac{10}{8}$ **or** $1\frac{2}{8}$

Step 1

$\frac{5}{8} \times 2 = \frac{10}{8}$

Step 2

$8\overline{)10}\ 1\ \underline{2}\ \ 8$ $= 1\frac{2}{8}$ **or** $1\frac{1}{4}$

Step 1

First, multiply the **numerator** 5 by the **integer** 2, to equal a **new numerator** of 10.
The **denominator** remains the **same as** 8, making **ten-eighths**.

Step 2

Then, **ten-eighths** is an **improper fraction** that must be converted into a **mixed number**.
Next, use **short division**, divide the **numerator** by the **denominator**.
10 (numerator) is divided by 8 (denominator), which is 1 remainder 2.
The **remainder** 2 is written as a fraction, becoming the **numerator** and the **denominator** remains the **same as** 8.
Finally, the **total value** is **one** and **two-eighths** or **one** and **one-quarter**.
(Simplify if possible)

Test Questions

1) $\frac{5}{8} \times 2 = \_\_\_$

2) $\frac{5}{7} \times 6 = \_\_\_$

3) $\frac{3}{8} \times 3 = \_\_\_$

4) $\frac{1}{5} \times 6 = \_\_\_$

5) $\frac{1}{6} \times 3 = \_\_\_$

6) $\frac{1}{5} \times 4 = \_\_\_$

7) $\frac{1}{6} \times 5 = \_\_\_$

8) $\frac{3}{7} \times 8 = \_\_\_$

Multiply Mixed Fractions

1) $4\frac{2}{5} \times 3 = \frac{?}{}$

Strategy Applied

4 represents the **whole number**.
2 represents the **numerator**. $\frac{2}{5}$ 3 represents the **integer**.
5 represents the **denominator**.

$4\frac{2}{5} \times 3$ means **three lots of** four and **two-fifths**.

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

Step 1 **Step 2** **Step 3**

$4 \times 5 + 2 = \frac{22}{5}$ $\frac{22 \times 3}{5} = \frac{66}{5}$ $5\overline{)66}\ 13\ \frac{1}{5} = 13\frac{1}{5}$

Step 1
Convert the **mixed fraction** four and **two-fifths** into an **improper fraction**.
First, multiply the **whole number** 4 by the **denominator** 5 and then add the **numerator** 2, to equal the **new numerator** of 22.
The **denominator** remains the **same as** 5, making the **improper fraction** of **twenty two-fifths**.

Step 2

Multiply the **improper fraction** by the **integer**.
Then, multiply the **numerator** **22** by the **integer** **3**, to equal the **new numerator** of **66**.
The **denominator** remains the same as **5**, making an **improper fraction** of **sixty six-fifths**.

Step 3

Convert the **improper fraction** into a **mixed fraction**.
Next, use **short division** and divide the **numerator** by the **denominator**.
66 (numerator) is divided by **5** (denominator), which is **13** remainder **1**.
The **remainder** **1** is written as a fraction, becoming the **numerator** and the **denominator** remains the **same as** **5**.
Finally, **total value** is **thirteen** and **one-fifth**. (Simplify if possible)

Test Questions

1) $4\frac{2}{5} \times 3 =$ ___

2) $4\frac{1}{3} \times 3 =$ ___

3) $5\frac{5}{6} \times 2 =$ ___

4) $2\frac{3}{5} \times 5 =$ ___

5) $2\frac{1}{3} \times 4 =$ ___

6) $3\frac{5}{6} \times 4 =$ ___

7) $2\frac{4}{5} \times 3 =$ ___

8) $4\frac{1}{3} \times 5 =$ ___

Find The Missing Number

1) $\frac{1}{4} \times 2 = \frac{1}{8} + \frac{?}{8}$

Strategy Applied

Step 1

First, calculate the **known** number sentence $\frac{1}{4} \times 2$

Step 2

Then, multiply the **numerator** 1 by 2 the **integer** and the **denominator** 4 remains the **same**, to equal **two-quarters**.

Step 3

Next, we know now $\frac{2}{4} = \frac{1}{8} + \frac{?}{8}$

Step 4

Then, make the denominators 4 and 8 equivalent, by working out the **Lowest Common Denominator** (**LCD**), which is 8.

Step 5

Next, for **one-quarter**, the **denominator** 4 is multiplied by 2 to make it **equivalent** to 8 (**LCD**).

The **numerator** 2 is also multiplied by 2, equal to 4.

The equivalent fraction is $\frac{4}{8}$.

Step 6

Finally, $\frac{4}{8} = \frac{1}{8} + \frac{?}{8}$ **or the inverse of** $\frac{4}{8} - \frac{1}{8} = \frac{3}{8}$

The **value** of the missing **numerator** is 3.

Test Questions

1) $\frac{1}{4} \times 2 = \frac{1}{8} + \frac{\quad}{8}$

2) $\frac{4}{9} + \frac{2}{3} = 1 + \frac{\quad}{9}$

3) $\frac{2}{3} \times 4 = \frac{\quad}{15}$

4) $\frac{3}{8} + \frac{\quad}{\quad} = 1\ \frac{1}{8}$

5) $\frac{1}{5} + \frac{3}{5} + \frac{2}{10} = \frac{\quad}{20}$

6) $5\ \frac{\quad}{7} = \frac{37}{\quad}$

7) $\frac{2}{7}$ of $\frac{\quad}{\quad} = 40$

8) $1\ \frac{1}{4} - \frac{\quad}{\quad} = \frac{7}{8}$

9) $\frac{3}{4} - \frac{\quad}{8} = \frac{1}{2}$

10) £35 = $\frac{2}{\quad}$ of £87.50

Answers

P. 2

1) 7 million, 6 hundred thousands, 5 ten thousands, 4 thousand, 3 hundreds, 2 tens, 1 ones
2) 5 million, 1 hundred thousands, 2 ten thousands, 4 thousand, 6 hundreds, 1 tens, 9 ones
3) 6 million, 2 hundred thousands, 1 ten thousands, 7 thousand, 9 hundreds, 8 tens, 3 ones
4) 9 million, 3 hundred thousands, 5 ten thousands, 3 thousand, 7 hundreds, 7 tens, 4 ones
5) 8 million, 4 hundred thousands, 0 ten thousands, 6 thousand, 8 hundreds, 6 tens, 1 ones
6) 3 million, 5 hundred thousands, 3 ten thousands, 7 thousand, 9 hundreds, 0 tens, 2 ones
7) 1 million, 6 hundred thousands, 0 ten thousands, 1 thousand, 3 hundreds, 9 tens, 3 ones
8) 2 million, 7 hundred thousands, 2 ten thousands, 1 thousand, 5 hundreds, 4 tens, 8 ones
9) 5 million, 8 hundred thousands, 3 ten thousands, 4 thousand, 6 hundreds, 5 tens, 7 ones
10) 6 million, 0 hundred thousands, 9 ten thousands, 5 thousand, 3 hundreds, 7 tens, 2 ones

P. 4

1) 7,000,000, 600,000, 50,000, 4,000, 300, 20, 1
2) 5,000,000, 100,000, 20,000, 4,000, 600, 10, 9
3) 6,000,000, 200,000, 10,000, 7,000, 900, 80, 3
4) 9,000,000, 300,000, 50,000, 3,000, 700, 70, 4
5) 8,000,000, 400,000, 6,000, 800, 60, 1
6) 3,000,000, 500,000, 30,000, 7,000, 900, 2
7) 1,000,000, 600,000, 1,000, 300, 90, 3
8) 2,000,000, 700,000, 20,000, 1,000, 500, 40, 8
9) 5,000,000, 800,000, 30,000, 4,000, 600, 50, 7
10) 6,000,000, 90,000, 5,000, 300, 70, 2

Answers

P. 6

1) 134
2) 1,478
3) 10,360
4) 303
5) 1,404
6) 12,098
7) 1,917
8) 4,006
9) 10,400
10) 236
11) 1,899
12) 18,032
13) 311
14) 2,302
15) 15,033

P. 8

1) 611,000
2) 600,000
3) 213,000
4) 331,000
5) 910,000
6) 465,000
7) 660,000
8) 225,000
9) 510,000
10) 895,000
11) 89,600
12) 33,012
13) 68,810
14) 42,560

P. 10

1) 13.1, 13.4
2) 4, 10
3) 75, 90
4) 375, 450
5) -350 -300
6) 10, 45
7) 5.7, 7,6
8) 6.3, 7.2
9) 3.7, 4.6
10) 0.75, 1.65
11) $\frac{7}{8}$, $1\frac{1}{8}$
12) $4\frac{5}{3}$, $5\frac{1}{3}$

P. 12

1) 3.915
2) 3.863
3) 8.962
4) 8.996
5) 7.989
6) 6.888
7) 7.995
8) 10.112
9) 10.104
10) 6.906
11) 7.609
12) 10.048
13) 7.268
14) 9.152

P. 14

1) 709,535
2) 816,103
3) 156,784
4) 643,432
5) 790,422
6) 201,845
7) 692,772
8) 1,423,332
9) 176,346
10) 733,392
11) 1,367,852
12) 2,018,468
13) 1,763,474
14) 188,482

P. 16

1) 53.724
2) 42.585
3) 120.80
4) 53.762
5) 133.509
6) 115.76
7) 89.072
8) 66.893
9) 245.81
10) 32.765
11) 120.804
12) 115.772
13) 245.824
14) 237.92

P. 18

1) 5,850
2) 8,150
3) 370,701
4) 501,999
5) 292,888
6) 483,999
7) 244,888
8) 1,000
9) 1,000
10) 2,350
11) 1,650
12) 4,000
13) 2,000
14) 752,035

P. 20

1) 56
2) 522
3) 41
4) 797
5) 57
6) 793
7) 22
8) 695
9) 62
10) 865
11) 13
12) 70
13) 91
14) 700

Answers

P. 22

1) 528,000
2) 712,000
3) 542,000
4) 690,000
5) 693,000
6) 787,000
7) 680,000
8) 19,000
9) 760,000
10) 24,000
11) 510,000
12) 228,000
13) 860,000
14) 245,000

P. 24

1) 14.7, 14.3
2) -6 -14
3) 45, 39
4) 700, 650
5) -50 -175
6) -390 -455
7) 3.1, 2.4
8) 7.0, 6.5
9) 11.1, 10.7
10) -9.05 -11.05
11) $\frac{2}{9}$, 0
12) $\frac{3}{8}$, $\frac{1}{8}$

P. 26

1) 1.111
2) 1.221
3) 4.214
4) 6.116
5) 4.508
6) 2.611
7) 1.301
8) 3.101
9) 7
10) 0.402
11) 3.016
12) 3.605
13) 4.304
14) 6.003

P. 28

1) 15,922
2) 29,898
3) 2,494
4) 28,934
5) 8,504
6) 17,944
7) 31,312
8) 70,617
9) 34,549

P. 30

1) 44.945
2) 18.889
3) 23.95
4) 49.217
5) 19.622
6) 17.45
7) 27.110
8) 28.101
9) 9.73
10) 23.627
11) 11.856
12) 27.03

P. 32

1) 1.55km
2) 57.62
3) 10,235
4) 14,143
5) 100
6) 70
7) 3,650
8) 98,900
9) 299,301
10) 484
11) 237
12) 398,900
13) 495,900
14) 712,800

P. 34

1) 200
2) 280
3) 400
4) 480
5) 280
6) 720
7) 330
8) 360
9) 440
10) 480
11) 420
12) 720
13) 1,280
14) 2,050

P. 36

1) 2,400
2) 5,400
3) 4,000
4) 3,500
5) 3,000
6) 3,200
7) 2,100
8) 5,600
9) 4,900
10) 8,100
11) 1,100
12) 2,400
13) 6,300
14) 8,800

Answers

P. 38

1) 21.3, 213, 2,130
2) 257, 2,570, 25,700
3) 6,324, 63,240, 632,400
4) 75.4, 754, 7,540
5) 629, 6,290, 62,900
6) 4,719, 47,190, 471,900
7) 44.7, 447, 4,470
8) 615, 6,150, 61,500
9) 8,102, 81,020, 810,200
10) 36.05, 360.5, 3,605
11) 543.6, 5,436, 54,360
12) 6,718, 67,180, 671,800
13) 55.74, 557.4, 5,574
14) 720.3, 7,203, 72.030
15) 6,139, 61,390, 613,900

P. 40

1) 17
2) 24
3) 13
4) 25
5) 36
6) 80
7) 61
8) 74
9) 189
10) 206
11) 1,008
12) 133.0
13) 129
14) 108

P. 42

1) 264,292
2) 631,611
3) 1,242,612
4) 2,150,125
5) 3,125,214
6) 4,297,384
7) 5,796,568
8) 7,394,463

P. 44

1) 66.230
2) 290.888
3) 34.56
4) 433.494
5) 267.290
6) 38.64
7) 653.492
8) 147.150
9) 431.15

P. 46

1) 1,992
2) 3,288
3) 153,384
4) 2,444
5) 16,488
6) 331,093

P. 48

1) 10
2) 10
3) 80
4) 3,693
5) 64
6) 12
7) 12
8) 168
9) 1,789
10) 0
11) 9
12) 168
13) 3,865
14) 0

P. 50

1) 110
2) 90
3) 70
4) 60
5) 60
6) 40
7) 40
8) 80
9) 60
10) 50
11) 70
12) 90
13) 120
14) 120

Answers

P. 52

1) 60
2) 60
3) 70
4) 110
5) 150
6) 120
7) 30
8) 70
9) 80
10) 50
11) 110
12) 90
13) 90
14) 120

P. 54

1) 21.3, 2.13, 0.213
2) 25.7, 2.57, 0.257
3) 632.4, 63.24, 6.324
4) 7.5, 0.75, 0.075
5) 6.2, 0.62, 0.062
6) 471.9, 47.19, 4.719
7) 0.4, 0.04, 0.004
8) 0.6, 0.06, 0.006
9) 810.2, 81.02, 8.102
10) 60.5, 6.05, 0.0605
11) 5430.6, 543.06, 54.306
12) 671.8, 67.18, 6.718
13) 5,507.4, 550.74, 55.074
14) 720.3, 72.03, 7.203
15) 6013.9, 601.39, 60.139

P. 56

1) 3,139 r2
2) 1,738 r1
3) 4,480
4) 1,586
5) 351 r1
6) 2,255 r4
7) 4,142 r2
8) 5,843
9) 8,752
10) 19,759

P. 58

1) 0.265
2) 1.385
3) 0.61
4) 1.23
5) 3.06
6) 0.965
7) 0.151
8) 0.824
9) 0.54
10) 0.932

P. 60

1) 220
2) 76
3) 160
4) 480
5) 80
6) 180
7) 23
8) 137
9) 19
10) 79
11) 55
12) 145
13) 75
14) 105

P. 62

1) 5,470,000
2) 9,270,000
3) 9,880,000
4) 5,890,000
5) 2,170,000
6) 1,080,000
7) 1,040,000
8) 2,010,000
9) 3,870,000
10) 6,560,000
11) 6,320,000
12) 8,720,000
13) 9,090,000
14) 2,940,000

P. 64

1) 5,500,000
2) 9,300,000
3) 9,900,000
4) 5,900,000
5) 2,200,000
6) 1,100,000
7) 1,000,000
8) 2,000,000
9) 3,900,000
10) 6,600,000
11) 6,300,000
12) 8,700,000
13) 9,100,000
14) 3,000,000

Answers

P. 66

1) 5,000,000
2) 9,000,000
3) 7,000,000
4) 6,000,000
5) 2,000,000
6) 1,000,000
7) 1,000,000
8) 2,000,000
9) 4,000,000
10) 7,000,000
11) 6,000,000
12) 9,000,000
13) 9,000,000
14) 3,000,000

P. 68

1) 37.8
2) 45.6
3) 49.5
4) 29.64
5) 54.6
6) 25.2
7) 25.3
8) 34.3
9) 56.8
10) 6.6
11) 114
12) 222.5
13) 235.2
14) 156.4

P. 70

1) 120cm
2) 42km
3) 1,200m
4) £1.69
5) 300
6) 100
7) £45.00
8) 77.00
9) £0.90
10) £8.00

P. 72

1) $\frac{22}{15}$ or $1\ \frac{7}{15}$
2) $\frac{43}{30}$ or $1\ \frac{13}{30}$
3) $\frac{20}{12}$ or $1\ \frac{2}{3}$
4) $\frac{9}{12}$ or $\frac{3}{4}$
5) $\frac{13}{12}$ or $1\ \frac{1}{12}$
6) $\frac{7}{12}$
7) $\frac{7}{8}$
8) $\frac{11}{12}$
9) $\frac{8}{15}$
10) $\frac{13}{30}$

P. 74

1) $\frac{13}{20}$
2) $\frac{9}{20}$
3) $\frac{7}{12}$
4) $\frac{3}{6}$ or $\frac{1}{2}$
5) $\frac{5}{9}$
6) $\frac{4}{9}$
7) $\frac{1}{20}$
8) $\frac{2}{30}$ or $\frac{1}{15}$
9) $\frac{3}{12}$ or $\frac{1}{4}$
10) $\frac{2}{9}$

Answers

P. 76

1) $\frac{8}{10}$ or $1\ \frac{1}{4}$

2) $\frac{30}{7}$ or $4\ \frac{2}{7}$

3) $\frac{9}{8}$ or $1\ \frac{1}{8}$

4) $\frac{6}{5}$ or $1\ \frac{1}{5}$

5) $\frac{3}{6}$ or $\frac{1}{2}$

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

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

8) $\frac{24}{7}$ or $3\ \frac{3}{7}$

P. 78

1) $\frac{66}{5}$ or $13\ \frac{1}{5}$

2) $\frac{39}{3}$ or 13

3) $\frac{70}{6}$ or $11\ \frac{2}{3}$

4) $\frac{65}{5}$ or 13

5) $\frac{28}{3}$ or $9\ \frac{1}{3}$

6) $\frac{92}{6}$ or $15\ \frac{1}{3}$

7) $\frac{42}{5}$ or $8\ \frac{2}{5}$

8) $\frac{65}{3}$ or $21\ \frac{2}{3}$

P. 80

1) 3
2) 1
3) 40
4) $\frac{6}{8}$
5) 20
6) 2 and 7
7) 140
8) $\frac{3}{8}$
9) 2
10) 5

Glossary

Common Factor is a number which is a factor of two or more other numbers, e.g. 3 is a common factor of the numbers 9 and 30.

Common Multiple is an integer which is a multiple of a given set of integers, e.g. 24 is a common multiple of 2, 3, 4, 6, 8 and 12.

Decimal Fraction is tenths, hundredths, thousandths etc. represented by digits following a decimal point. E.g. 0.125 is equivalent to 1/10 + 2/100 + 5/1000 or 1/8. The decimal fraction representing 1/8 is a terminating decimal fraction since it has a finite number of decimal places.
Other fractions such as 1/3 produce recurring decimal fractions, these have a digit or group of digits that is repeated indefinitely.

Denominator is the number written below the line i.e. the divisor.
e.g. in the fraction ⅔ the denominator is 3.

Digit Value is the value of a digit that relates to its position or place in a number. e.g. in 82 the digits represent 8 tens and 2 ones.

Equivalent Fraction are fractions with the same value as another.
e.g. 4/8, 5/10, 8/16 are all equivalent fractions and all are equal to 1/2.

Exchanging is to exchange a number for another of equal value. The process of regrouping is used in some standard compact methods of calculation. e.g.: 'carrying figures/exchanging' in addition, multiplication or division; and 'decomposition' in subtraction.

Factor is when a number, can be expressed as the product of two numbers, these are factors of the first. E.g. 1, 2, 3, 4, 6 and 12 are all factors of 12 because $12 = 1 \times 12 = 2 \times 6 = 3 \times 4$.

Glossary

Highest Common Factor (H.C.F.) is the common factor of two or more numbers which has the highest value.
e.g. 16 has factors 1, 2, 4, 8, 16. 24 has factors 1, 2, 3, 4, 6, 8, 12, 24. 56 has factors 1, 2, 4, 7, 8, 14, 28, 56. The common factors of 16, 24 and 56 are 1, 2, 4 and 8. Their highest common factor is 8.

Improper Fraction is an improper fraction has a numerator that is greater than its denominator. Example: 9/4 is improper and could be expressed as the mixed number 2 1/4.

Integer is any of the positive or negative whole numbers and zero.
e.g. …2, -1, 0, +1, +2 …

Lowest Common Multiple (L.C.M.) is the common multiple of two or more numbers, which has the least value. E.g. 3 has multiples 3, 6, 9, 12, 15 4 has multiples 4, 8, 12, 16, 20, 24 … and 6 has multiples 6, 12, 18, 24, 30 .. The common multiples of 3, 4 and 6 include 12, 24 and 36.
The lowest common multiple of 3, 4 and 6 is 12.

Mixed Fraction is a whole number and a fractional part expressed as a common fraction. e.g. 1 1/3 is a mixed fraction or mixed number.

Mixed Number is a whole number and a fractional part expressed as a common fraction. Example: 2 1/4 is a mixed number.
Also known as a mixed fraction.

Multiple is the result of multiplying a number by an integer,
e.g. 12 is a multiple of 3 because $3 \times 4 = 12$.

Non-Unit Fraction is a fraction that has a value of 2 or more as the numerator and whose denominator is a non-zero integer. E.g. 1/2, 1/3.

Glossary

Numerator is the number written on the top– the dividend (the part that is divided). In the fraction 2/3, the numerator is 2.

Operations that, when they are combined, leave the entity on which they operate unchanged. Examples: addition and subtraction are inverse operations e.g. 5 + 6 – 6 = 5. Multiplication and division are inverse operations e.g. 6 × 10 ÷ 10 = 6.

Partition 1) To separate a set into subsets. 2) To split a number into component parts. e.g. the two-digit number 38 can be partitioned into 30 + 8 or 19 + 19. 3) A model of division. e.g. 21 ÷ 7 is treated as 'how many sevens in 21?'

Percentage 1) A fraction expressed as the number of parts per hundred and recorded using the notation %. E.g. One half can be expressed as 50%; The whole can be expressed as 100% 2) Percentage can also be interpreted as the operator 'a number of hundredths of'.
E.g. 15% of Y means 15/100 × Y.

Place Holder In decimal notation, the zero numeral is used as a place holder to denote the absence of a power of 10.

Place Value is the value of a digit that relates to its position or place in a number. e.g. in 1482 the digits represent 1 thousand, 4 hundred, 8 tens and 2 ones respectively; in 12.34 the digits represent 1 ten, 2 ones, 3 tenths and 4 hundredths respectively.

Proper Fraction has a numerator that is less than its denominator so 3/4 is a proper fraction, whereas 4/3 is an improper fraction.

Glossary

Regrouping is to exchange a number for another of equal value. The process of regrouping is used in some standard compact methods of calculation. e.g.: 'carrying figures/exchanging' in addition, multiplication or division; and 'decomposition' in subtraction.

Remainder in the context of division requiring a whole number answer (quotient), the amount remaining after the operation.
e.g. 29 divided by 7 = 4 remainder 1.

Simplify Fraction is to simplify a fraction down to its lowest terms. The numerator and denominator are divided by the same number e.g. 4/8 = 2/4, also to 'reduce' a fraction.
When the numerator and denominator are both divided by their highest common factor the fraction is said to have been cancelled down to give the equivalent fraction in its lowest terms. e.g.18/30 = 3/5 (dividing numerator and denominator by 6).

Unit Fraction is a fraction that has 1 as the numerator and whose denominator is a non-zero integer. e.g.1/2, 1/3.