Year 5

Problem solving

- number

teachit

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Introduction

This pack features nine units covering the problem-solving aspects of year 5 maths. Each unit includes comprehensive activities, differentiated to three levels, based on the number problem-solving objectives in the year 5 maths curriculum. Includes example sections for whole class scaffolded work, investigations, word problems, teaching notes and step-by-step answers.

Within each unit there are three levels of exercises, A, B, C, which follow support, core and extension according to the following:

Set A is for the support [S] group
Set B is for the core [C] group
Set C is for the extension [E] group

The questions in the example sections use the bracketed symbols, [S], [C] and [E], to indicate the level of the work.

We hope you enjoy using this pack. If you have any questions, please get in touch: email **support@teachitprimary.co.uk** or call us on 01225 788851. Alternatively, you might like to give some feedback for other Teachit Primary members – you can do this by adding a comment on the **Y5 Problem solving - number** page on Teachit Primary (please log in to access this).
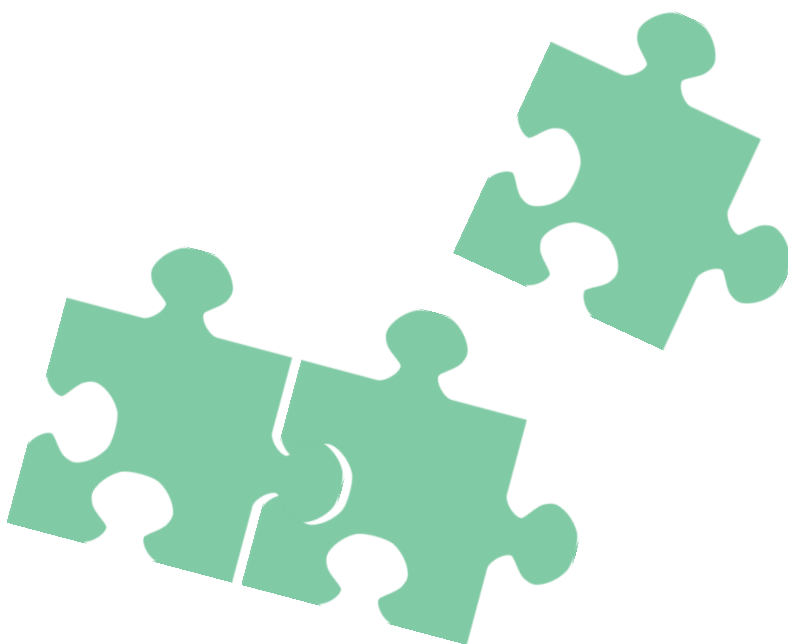
Unit 1 –
Place value number problems

In this unit, you will:

- read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- round any number up to the nearest 10, 100, 1000, 10,000 and 100,000
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Whole class examples:

1. a. Write the following numbers in figures: [S]

       i. Three hundred and seven

       ii. Seven thousand and twenty-three

    b. Write the following numbers in words: [S]

       a. 390

       b. 1604

2. Round the following numbers using the rules indicated in the brackets: [S]

       a. 54 (nearest 10)

       b. 173 (nearest hundred)

       c. 7486 (nearest 1000)

       d. 14,500 (nearest 1000)

3. Using any of the digits 2, 4, 8 and 9, once only in each number, write: [C]

    a. the largest number that can be made

    ☐☐☐☐

    b. the smallest 3-digit number that can be made

    ☐☐☐

    c. the largest 3-digit odd number that can be made

    ☐☐☐

    d. the value of the ones digit in the smallest 2-digit number that can be made

    ☐

    e. the value of the hundreds digit in the answer when the smallest 3-digit odd number is multiplied by 10

    ☐

    f. the smallest 2-digit odd number in Roman numerals.

    ☐

4. Here are four numbered cards. [E]

    6 **2** **3** **9**

    a. Use each number once to make the nearest decimal number which rounds up to 30.

    ☐☐.☐☐

    b. Write the smallest 3-digit number in Roman numerals.

    ☐☐☐
    ☐

Unit 1 – Set A:

1. a. Write the following numbers in figures:

    i. six hundred and twenty

    ii. seven thousand three hundred

    iii. twelve thousand four hundred and eight

    b. Write the following numbers in words:

    i. 79

    ii. 805

    iii. 2054

2. Round the number 8462 to the nearest:

    a. hundred

    b. thousand

3. What is three thousand seven hundred and nine rounded to the nearest hundred?

4. Using each of the digits 4, 7 and 8 once only in each number:

    a. write as many different 2-digit numbers as you can.

    b. write your answers again in order of size, starting with the smallest first.

    c. what is the digit in the hundreds place of the largest 3-digit number that can be made?

5. Using each of the digits 1, 6 and 9 once only in each number:

| 1 | 6 | 9 |

a. write as many different 2-digit numbers as you can

b. write down the <u>largest</u> **even** number and the <u>smallest</u> **odd** number

c. which 3-digit number rounds to a thousand to the nearest hundred.

6. Which of these numbers give 60 when **rounded** to the **nearest 10**? Circle all the correct numbers.

63   68   53   57   70   55   65

Unit 1 - Set B:

1. What is two thousand six hundred and twenty rounded to the nearest thousand?

2. A car costs more than £6700 and less than £7100.
    Put a circle around the prices below that the car could be.

   £6685   £6999   £7098   £7103   £6099

3. What number equals 6 ones + 7 tens + 2 hundreds + 40 thousands? Circle it.

    a. 2276   b. 40,276   c. 42,760   d. 674,020   e. 402,760

4. Using any of the digits 1, 4, 6 and 9 once only in each number, write:

a.	the smallest 2-digit **odd** number that can be made	☐☐
b.	the largest 3-digit number that can be made	☐☐☐
c.	the 3-digit number closest to five hundred	☐☐☐
d.	the value of the **ones** digit in the largest 2-digit number that can be made	☐
e.	the value of the **hundreds** digit in the answer when the largest 2-digit **odd** number is multiplied by 10	☐
f.	in Roman numerals, the 2-digit number that rounds to twenty when rounded to the nearest 10.	☐
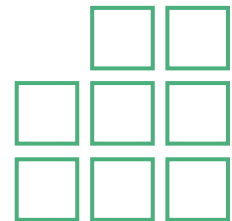
5. Fill in the possible numbers:

Number	27		991		
Rounded to the nearest 10		30		70	100

6.   a. Write the following numbers in Roman numerals.

   i.   fourteen

   [   ]

   ii.   32

   [   ]

   iii.   76

   [   ]

   iv.   209

   [   ]

   v.   Ninety-nine

   [   ]

   b. Write these Roman numerals as ordinary numbers.

   a.   XXIV

   [   ]

   b.   XL

   [   ]

   c.   CLIV

   [   ]

   d.   CCCLXI

   [   ]

   e.   CCLXXIX

   [   ]

   c. Write the answer to the following sum in Roman numerals.

   LXXVII + LXIV =   [   ]

Unit 1 - Set C:

1. Using any of the digits 3, 6, 7 and 8 once only in each number, write:

    a. the smallest 2-digit **odd** number that can be made

    b. the largest 3-digit **even** number that can be made

    c. the 3-digit number that is closest to five hundred

    d. the value of the **hundreds** digit in the answer when the largest 2-digit **odd** number is multiplied by 10.

2. Write down a number that obeys all of the following instructions:

    -   This is a three digit number
    -   If you add the digits they equal 8
    -   The tens digit is 6.

3. Write down the 4-digit number that obeys all of the following instructions:

    -   It rounds to 4000 to the nearest hundred
    -   The thousands digit is half the ones digit
    -   The tens digit is the sum of the thousands and units digits.

4. Can you explain what has been added to or subtracted from each number?

    a. 13,884 → 11,884

    b. 904,147 → 904,047

    c. 4087 → 3987

    d. 8100 → 8099

5. Two **whole** numbers are each rounded to the **nearest** 10.
    The sum of the rounded numbers is 50.

    <div style="text-align:center">☐ + ☐ = 50</div>

    Work out the maximum possible sum for the original two numbers.

6. Solve the following Roman numeral puzzles:
    e.g. Add 99 to ME (ran up the clock).

    Write 99 in Roman numerals. 99 = IC.

    Now M + IC + E = MICE (three mice 'ran up the clock).

    a. Add 100 to O N E (useful when hot).

    b. Take 4 away from L I V E D (bright lights).

    c. Add 11 to AS (x or y!).

    d. Take 54 away from R E L I V E D (long grass).

Unit 1 – Answers
Place value number problems

For progression, children can be guided as follows:

Support	Core
Set A – 2,3 → Set B – 1 Set A – 4,5 → Set B - 4	Set B - 4 → Set C – 1 Set B - 5 → Set C – 5 Set B - 6 → Set C – 6

- When pupils are asked to suggest 'what number would round to …?', we are quite happy for them to get any correct answer (support). However, when asked to find the maximum (or minimum), as in Set C Q3 and Q5, we are introducing them to 'limits of accuracy' which is established further in secondary school.
- Question Set C Q6 is a bit of cross-curricular work involving English.
- An additional resource called Roman 'numerwords' is provided to extend children and reinforce the use of roman numerals.

Whole class examples:

1. a.

i.	307	ii.	7023

b.

i.	three hundred and ninety
ii.	one thousand six hundred and four

2.

a.	50	b.	200
c.	7000	d.	15,000

3.

a.	9 8 4 2	b.	2 4 8
c.	8 4 9	d.	4
e.	(249 × 10 = 2490) 4	f.	**29 = XXIX**

4.

   a. Rounding to the nearest 10: 26.39; 26.93; 29.36; 29.63; 32.69; 32.96

   Rounding to the nearest whole number: **2** **9** . **6** **3**

                                        2 **3** **6**

   b.

               Smallest 3-digit number is 236 =   **CCXXXVI**

Unit 1 - Set A: Answers

1. a.

i.	620	ii.	7300	iii.	12,408

b.

i.	seventy nine	ii.	eight hundred and five
iii.	two thousand and fifty-four		

2.

a.	8462 = **8500 (nearest 100)**	b.	8462 = **8000 (nearest 1000)**

3.

three thousand seven hundred and nine = 3709   = **3700 (nearest 100)**

4.

a.	47, 48, 74, 78, 84, 87	b.	47, 48, 74, 78, 84, 87
c.	Largest 3-digit = 874 . . .		**8 (hundred)**

5.

a.	16, 19, 61, 69, 91, 96	b.	916, 19
c.	**9** **6** **1**		

6.

63   68   53   57   70   55   65

(63, 57, 55 circled)

Unit 1 - Set B: Answers

1.

> two thousand six hundred and twenty rounded to the nearest 1000 = 2620
> = 3000 (nearest 1000)

2.

£6685   (£6999)   (£7098)   £7103   £6099

3.

a. 2276   b. (40,276)   c. 42,760   d. 674,020   e. 402,760

4.

a.	1	9		b.	9	6	4

c.	4 9 6
d.	**9<u>6</u>**

e.	91 × 10 = **9<u>6</u>1, (9** hundreds)
f.	19 = **XIX**

5.

Number	27	25-34	991	65-74	95-104
Rounded to the nearest 10	**30**	30	**990**	70	100

Note: '25-34' means any integer 25, 26, 27, 28, 29, 30, 31, 32, 33, 34.

6. a.

i.	XIV	ii.	XXXII	iii.	LXXVI
iv.	CCIX	v.	99 = IC		

b.

i.	24	ii.	40	iii.	154
iv.	361	v.	279		

c.

LXXVII + LXIV = 77 + 64 = 141= **CXLI**

Unit 1 – Set C: Answers

1.

a. | 3 | 7 |

b. | 8 | 7 | 6 |

c. | 3 | 8 | 7 |

d. 87 × 10 = **8**70 (8 hundred)

2.

The hundreds and units digits must add up to 8 – 6 = 2.
Either 1 + 1 = 2 or 2 + 0 = 2.

| 1 | 6 | 1 |

or

So the 3-digit number is either | 2 | 6 | 0 |

3.

1. Rounding to 4000 (nearest 100) means any number between 3950 and 4049.
2. If the thousands digit is 3 then units digit is 6.
   If the thousands digit is 4 then units digit is 8.
3. The tens is either 3 + 6 = 9 ✓ or 4 + 8 = 12 ×.

So the 4-digit number is | 3 | 9 | 9 | 6 |

4.

a.	subtracted 2000	b.	added 100
c.	subtracted 100	d.	subtracted 1

5.

'30' could be any number between 25-34; '20' could be any number between 15-24. So maximum sum = 34 + 24 = **58.** [This is the same answer regardless.]

6.

a.	C + O N E = **CONE**	b.	L I V E D – I V = **LED**
c.	X I + A S = **AXIS**	d.	R E L I V E D – L I V = **REED**

Roman numerwords

Translate ordinary numbers into Roman numerals and either add or subtract the letters from an existing word to make a new one. A clue is given each time to help you.

I	V	X	L	C	D	M
1	5	10	50	100	500	1000

E.g. Add 99 to ME.   *Clue: They ran up the clock.*

- = IC. Now M + **IC** + E = MICE

E.g. Take 6 away from LIVID. *Clue: A top.*

  a. = VI, so L I **V** I **D** – **V I** = LID

No.	Question	Clue	Answer
1	Add 1000 to I C E.	They ran up the clock	
2	Add 100 to O N E.	A 3D shape	
3	Add 50 to P A N E.	Paper _ _ _ _ _	
4	Add 54 to E L Y.	Full of life and energy	
5	Add 1000 to C O B.	This has lots of teeth	
6	Take 54 away from R E L I V E D.	Long grass	
7	Take 499 away from D I V I D E.	Nose _ _ _ _	
8	Add 5 to A L I E.	Not quite dead	
9	Take 4 away from L I V E D.	Bright lights	
10	Take 9 away from D I X I E.	Singular of dice	
11	Take 6 away from D I V I N E.	Eat	

12	Add 150 to OUT.	A heavy blow	
13	Add 11 to AS.	*x* or *y*?	
14	Take 4 away from S I E V E.	Use your eyes	
15	Take 499 away from A I D S.	Like	
16	Add 9 to V E N.	She has cubs	
17	Add 1009 to R E E D.	Stirred again	
18	Add 151 to M A X.	Peak	
19	Take 999 from I M A G E.	Stone _ _ _	
20	Take 6 away from OV I N E.	A unit	
21	Add 4 to A L E.	We are all _ _ _ _ _	
22	Take away 11 from O X I D E S.	Type of poems	
23	Add 54 to D E E R.	What the Post Office do	
24	Subtract 59 from E L I X A T I N G.	Consuming	
25	Add 4 to F O R G E.	Let them off	
26	Add 551 to C O K E.	As the fish	
27	Subtract 151 from C Y C L I S T.	A sort of spot	
28	Add 504 to S K Y I N G.	An air sport	
29	Add 4 to C R E A T E.	Good at art	
30	Add 2001 to S L I N G.	Losing weight	

Answers:

1. MICE
2. CONE
3. PLANE
4. LIVELY

5. COMB
6. REED
7. DIVE
8. ALIVE

9. LED
10. DIE
11. DINE
12. CLOUT

13. AXIS
14. SEE
15. AS
16. VIXEN

17. REMIXED
18. CLIMAX
19. AGE
20. ONE

21. ALIVE
22. ODES
23. DELIVER
24. EATING

25. FORGIVE
26. CODLIKE
27. CYST
28. SKYDIVING

29. CREATIVE
30. SLIMMING

Unit 2 –
Place value practical problems

In this unit, you will:

- count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000

- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0

- solve number problems and practical problems that involve all of the above.

The number line below will be useful.

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

Negative numbers   Positive numbers
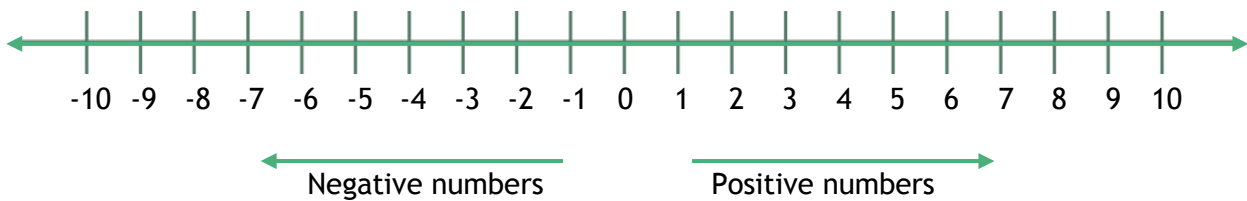
Whole class examples:

1. a. Starting at 610 write down the next four numbers by counting **forward** in 100s.

610				

   b. Starting at 4250 write down the next four numbers by counting **back** in 1000s. [S]

4250				

2. Circle the larger number: [S]

   a. -1   or   4   b. -4   or   3

   c. -2   or   5   d. -7   or   -4

3. Complete the following sequences and write down the rule: [C]

Starting number					Rule
14321	14421	14521	14621		
12045	11045		9045		
20	10	0		-20	

4. Spot the mistake in the sequences: [E]

a.	98	298	598	798		
b.	-60	-30	10	40		

Unit 2 - Set A:

1. Complete the following counting sequences:

	Starting number	Rule				
a.	407	+ 100	507			
b.	1247	+ 1000			4247	
c.	67,850	+10,000		87,850		
d.	142	-10		122		
e.	4765	-1000	3765			
f.	598	-100			298	

2. Spot the mistakes in the following sequences:

a.	70	80	90	110	120	
b.	250	300	315	400	450	
c.	0	30	50	70	90	
d.	800	900	1000	2000	2100	

3. Write down the following temparatures as indicated on the following thermometers:

a.

b.

c.
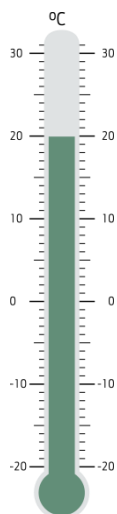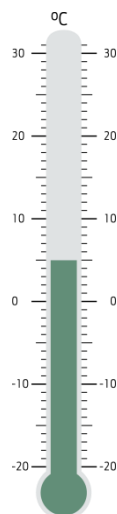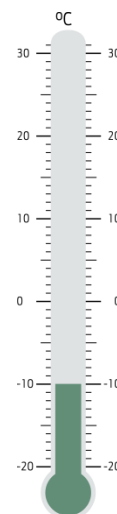
4. Circe the higher temperature in each case below:

   a. 4⁰C   or   7⁰C   b. 4⁰C   or   -7⁰C

   c. -4⁰C   or   3⁰C   d. -4⁰C   or   -3⁰C

   e. 11⁰C   or   -20⁰C   f. 0⁰C   or   -2⁰C

5. Write the temperature readings indicated by arrows **a** and **b**.
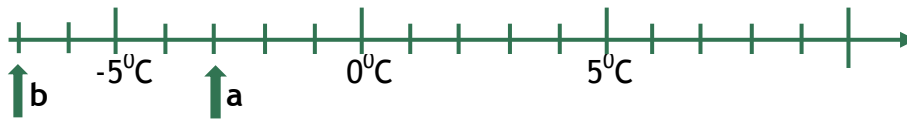
   a.   b.

Unit 2 - Set B:

1. Complete the following counting sequences:

	Starting number	Rule				
a.	497	+ 100		697		
b.	78,247	+ 10,000				118,247
c.	62,850	- 1000		60,850		
d.	35	-10			5	

2. Complete the following sequences and write down the rule:

	Starting number					Rule
a.	8045		10,045	11,045		
b.	107,500		87,500		67,500	
c.	-15	-5			25	

3. Spot the mistakes in the following sequences:

a.	950	1000	1150	1200	
b.	8670	9670	10,670	12,670	
c.	40	20	-10	-20	-40
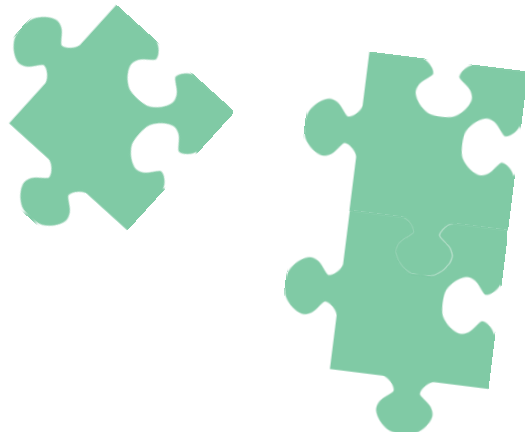
4. **a.** Write the temperature readings indicated by arrows **a** and **b**.

a.		b.	

b. **b** represents the temperature overnight in London. By noon, the next day the temperature had risen by 10^0C.

i. What is the new temperature in London?

ii. Draw an arrow to represent this on the temperature scale above. Label it **c**.

5. The temperature rises by 15 degrees from -6^0C. What is the new temperature?

6. The temperature falls from 11^0C to -3^0C. How many degrees does the temperature fall by?
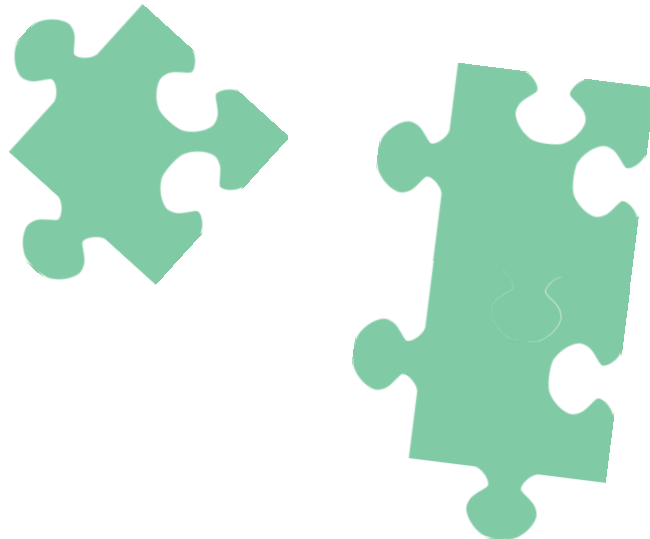
Unit 2 - Set C:

1. Complete the following counting sequences and write down the rule:

	Starting number					Rule
a.	44,059			14,059		
b.	-14		6	16		
c.	-22		-2		18	

2. The thermometer is showing the temperature reading in York at 8am one day.

°C

a. Write down the temperature at 8am.

b. By 1pm the temperature had risen by 7^0C. What was the temperature at 1pm?

c. Overnight, the temperature dropped down to -6^0C. By how many degrees did it fall?

d. On another occasion, the lowest temperature was -7^0C and the highest temperature was 10^0C. What is the difference in these temperatures?
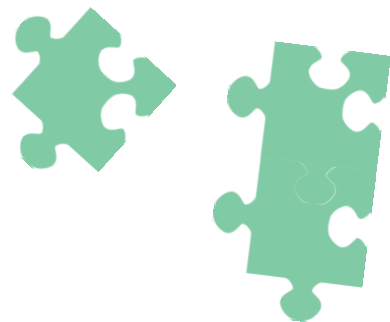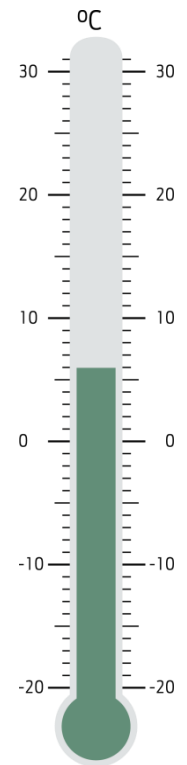
3. Spot the mistakes in the following sequences:

a.	850	950	1000	1150	
b.	-80	-50	-10	10	40
c.	-32	-12	12	32	52

4. On the diagram below we can see that the number 1(**c**) is halfway between points **a** and **b**.
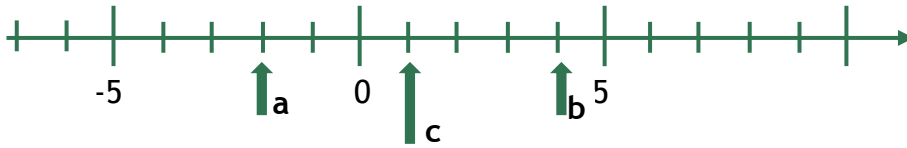
Find the number that is *halfway* between the following pairs of numbers:

a.	-3	and	5		b.	-5	and	3
c.	-4	and	10		d.	-10	and	-4

e. Can you think of a quicker method of finding halfway between -24 and 36?

Unit 2 - Answers
Place value practical problems

For progression, children can be guided as follows:

Support	Core
Set A - 1 → Set B – 1 Set A - 2 → Set B – 3 Set A – 5 → Set B – 4	Set B - 2 → Set C – 1 Set B - 3 → Set C – 3 Set B - 4 → Set C – 4 Set B – 5,6 → Set C - 2

Spotting the pattern by counting forwards and backwards should be encouraged when children are finding a 'change' in temperature (Set B Q4–6 and Set C Q2). This will place emphasis on the inclusion of 'zero', so important when dealing with directed numbers.

Whole class examples:

1. a.

610	710	810	910	1010

   b.

4250	3250	2250	1250	250

2.

   a. -1   or   ④   b. -4   or   ③
   c. (-2)   or   5   d. -7   or   (-4)

3.

Starting number					Rule
14,321	14,421	14,521	14,621	**14,721**	**+100**
12,045	11,045	**10,045**	9045	**8045**	**-1000**
20	10	0	**-10**	-20	**-10**

4.

   a. | The rule is '+200' and the numbers should be 98   298   498   698 |
   |---|

   b. | The rule is '-30' and the numbers should be -60 -30   0 30 |
   |---|

Unit 2 - Set A: Answers

1.

	Starting number	Rule				
a.	407	+ 100	507	607	707	807
b.	1247	+ 1000	2247	3247	4247	5247
c.	67,850	+10,000	77,850	87,850	97,850	107,850
d.	142	-10	132	122	112	102
e.	4,765	-1,000	3,765	2765	1765	765
f.	598	-100	498	398	298	198

2.

a.	The rule is '+10' and the numbers should be 70 80 90 **100 110 120**
b.	The rule is '+50' and the numbers should be 250 300 **350** 400 450
c.	The rule is '+30' and the numbers should be 0 30 **60 90 120**
d.	The rule is '+100' and the numbers should be 800 900 100 **1100 1200**

3.

a. 20^0C   b. 5^0C   c. -10^0C

4.

a. 4^0C   or   ⟨7^0C⟩   b. ⟨4^0C⟩   or -7^0C

c. -4^0C   or   ⟨3^0C⟩   d. -4^0C   or   ⟨-3^0C⟩

e. ⟨11^0C⟩   or -20^0C   f. ⟨0^0C⟩   or -2^0C

5.

a. **-3^0C**   b. **-7^0C**

Unit 2 - Set B: Answers

1.

Starting number					Rule
a.	497	+ 100	**597**	697	**797**	**897**
b.	78,247	+ 10,000	**88,247**	**98,247**	**108,247**	118,247
c.	62,850	- 1000	**61,850**	60,850	**59,850**	**58,850**
d.	35	- 10	**25**	15	5	- 5

	Starting number					Rule
a.	497	+ 100	**597**	697	**797**	**897**
b.	78,247	+ 10,000	**88,247**	**98,247**	**108,247**	118,247
c.	62,850	- 1000	**61,850**	60,850	**59,850**	**58,850**
d.	35	- 10	**25**	15	5	- 5

2.

	Starting number				Rule
a.	8045	**9045**	10,045	11,045	**12,045**	'+1000'
b.	107,500	**97,500**	87,500	**77,500**	67,500	'-10,000'
c.	-15	-5	**5**	**15**	25	'+10'

3.

a.	The rule is '**+50**' and the numbers should be 950 1000 **1050 1100**
b.	The rule is '**+1000**' and the numbers should be 8670 9670 10,670 **11,670**
c.	The rule is '**-20**' and the numbers should be 40 20 **0** -20 -40

4. a.

i.	**-3^{0}C**	ii.	**-7^{0}C**

b.

i.	New (noon) temperature = -7 + 10 = (+) **3^{0}C** [counting down *through* zero]
ii.	Drawn 3 units to the right of 0^{0}C.

5.

New temperature = -6 + 15 = (+) **9^{0}C**

6.

Fall = 11 – (-3) = **14^{0}C** [counting down *through zero*]

Unit 2 - Set C: Answers

1.

	Starting number					Rule
a.	44,059	34,059	24,059	14,059	4059	'-10,000'
b.	-14	-4	6	16	26	'+10'
c.	-22	-12	-2	8	18	'+10'

2.

a.	-4^0C	b.	4 + 7 = (+) 3^0C
c.	Fall in temperature = 3 – (-6) = 9^0C [counting down *through zero*]		
d.	Difference in temperature = 10 – (-7) [counting down *through zero*] = 17^0C		

3.

a.	The rule is '**+100**' and the numbers should be 850 950 **1050 1150**
b.	The rule is '**+30**' and the numbers should be -80 -50 **-20** 10 40
c.	The rule is '**+20**' and the numbers should be -32 -12 **8 28 48**

4.

a.	1	b.	-1
c.	3	d.	-7
e.	**Find the average:** 1. -24 + 36 = 12 2. Divide by 2 ... 12 ÷ 2 = **6**		

Unit 3 –
Addition and subtraction problems

In this unit, you will:

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

The following phrases will be useful to know:

Addition (+)	Subtraction (-)
'find the **total**…' 'find the **sum of**…' '…is **increased** by…' 'how many **altogether**?' '**plus** or **added to**'	'find the **difference** between' '… **decreased** by…' '**subtract** from…' 'how much **more**/ **less**?' '**minus** or **dropped** by'

Whole class examples:

1. Fill in the gaps: [S]

   a. $9 + \boxed{} = 30$ b. $51 + \boxed{} = 100$

   c. $350 + \boxed{} = 1000$ d. $60 - \boxed{} = 13$

   e. $\boxed{} - 25 = 37$ f. $\boxed{} - 1650 = 2000$

2. The digits in the 2-digit number 23 add up to give 5 (2 + 3 = 5).
   How many other numbers have digits that add up to 5? They must not have any zeros. [S]

3. Use any whole numbers as many times as you like to make each line of the rectangle add up to 10. [C]
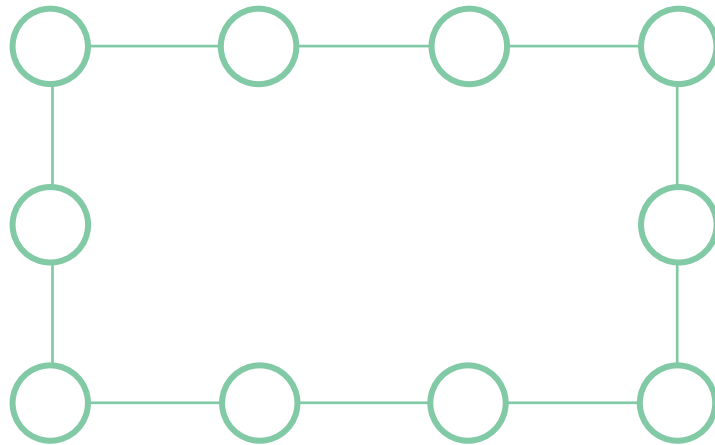
4. Kerry had a pack of 15 cards numbered from 1 to 15. She arranged the cards into 5 unequal piles where each pile added to the same total. What was the total and how could this be done? [E]

Unit 3 - Set A:

1. Fill in the gaps:

   1. $7 +$ ☐ $= 20$ 2. $31 +$ ☐ $= 100$

   3. $650 +$ ☐ $= 1000$ 4. $30 -$ ☐ $= 17$

   5. ☐ $- 24 = 36$ 6. ☐ $- 1450 = 2000$

2. The digits in the 2-digit number 24 add up to give 6 (2 + 4 = 6).
   How many other numbers have digits that add up to 6? They must not have any zeros.

3. There are exactly 3 ways to add 4 odd numbers to get 10.
   For example: 1 + 3 + 5 + 1 = 10.
   Find the other two ways.

4. Place each of the numbers **1** to **7** in the circles below so that each line adds up to the **same total**.

   ☐ ☐ ☐ ☐ ☐ ☐ ☐
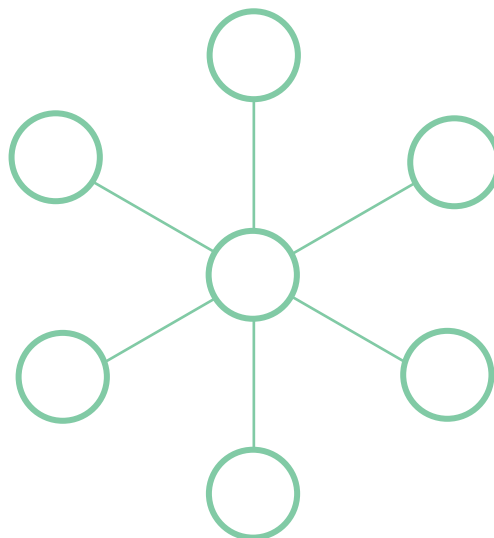
5. Kathy had a pack of 9 cards numbered from 1 to 9.
   She arranged the cards into 5 unequal piles where
   each pile added to the **same total.**

   What was the total and how could this be done?

1	2	3
4	5	6
7	8	9
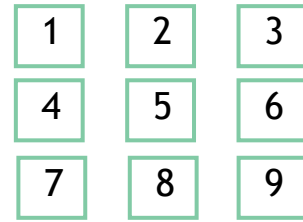
6. **a.** Place each of the numbers 1 to 5 in the V shape so that the two arms of the V have
   the **same total.**

   b. How many different ways can you find of doing it?

1	2	3	4	5
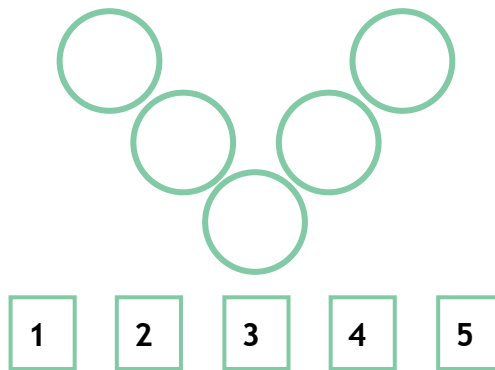
7. Place each of the numbers **1** to **8** in the boxes below so that each row adds up to a
   total equal to 12.

   Total = 12

1	2	3	4	5	6	7	8

8. Numbers can be known as **palindromes**. For example, 77, 242, 12,321, all *read the same forwards as they do backwards.*

    a. Circle the numbers that are palindromic:

        27   72   181   405   505   148,841

    b. Write down some 4-digit and 5-digit palindromic numbers.

    c. **Now try the following:**

        • Write down any number that is more than one digit. **(e.g. 38)**

        • Write down the number reversed beneath the first number. **(83)**

        • Add the two numbers together. **(38 + 83 = 121)**

        • 121 is indeed a palindrome.

        • For some numbers you may need to repeat the process until you reach a palindrome.

        Using the same steps:

          i. Try this with the number **27**.

         ii. Next try the number **49**. Continue to repeat the steps from 2-4 if needed until you reach a palindrome.

        iii. Every time you go through steps 1 – 4 we call it a **stage**.

            Now try some other 2-digit numbers to find which one takes the most **stages** to get to a palindrome (**27** took 1 stage, **49** took 2 stages).

Unit 3 - Set B:

1. Fill in the gaps:

   a.   17 + ☐ = 50

   b.   431 + ☐ = 1000

   c.   4650 + ☐ = 10000

   d.   300 - ☐ = 125

   e.   ☐ - 148 = 523

   f.   ☐ - 8420 = 2000

2. The digits in the number 27 add up to give 9 (2 + 7 = 9).
   How many other numbers have digits that add up to 9? They must not have any zeros.

3. a. Find as many ways as you can to add 4 odd numbers to get a total of 10.

   For example: 1 + 3 + 5 + 1 = 10.

   b Now find as many ways as you can to add 4 odd numbers to get a total of 20.

4. Place each of the numbers **1** to **9** in the circles below so that each line adds up to twenty.

1	2	3	4	5	6	7	8	9
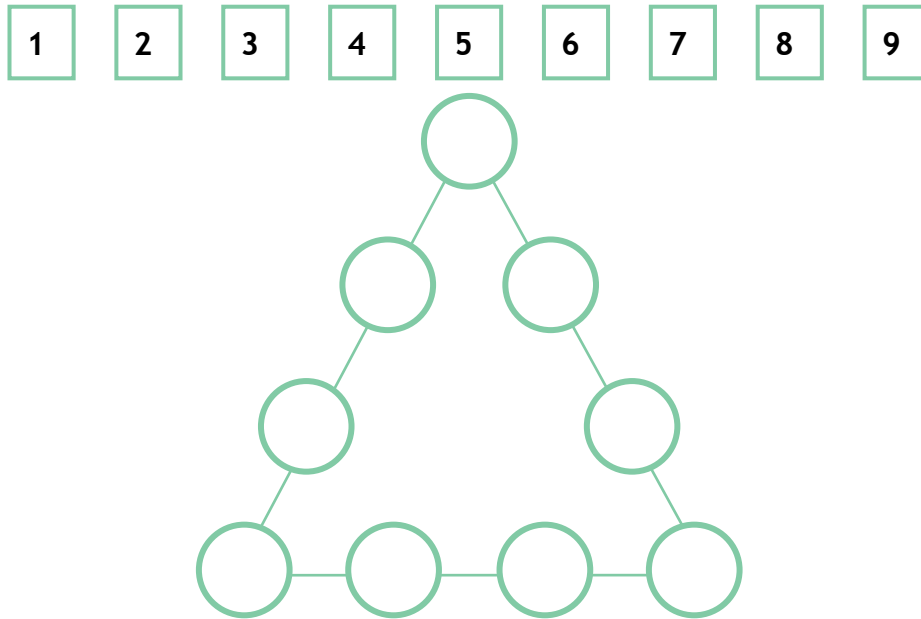
5. Use any whole numbers as many times as you like to make each line of the rectangle add up to 20.
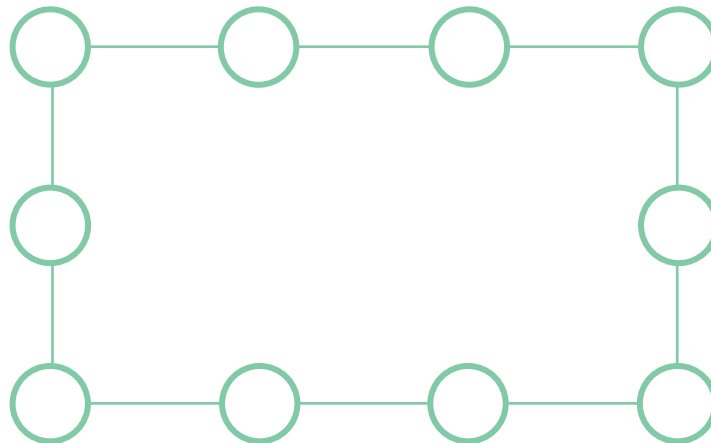
6. A set of 10 cards, each showing one of the digits from 0 to 9, is divided up between five envelopes so that there are two cards in each envelope. The sum of the two numbers inside it is written on each envelope as shown.

   Find which numbers went into each envelope.

7	8	13	14	3

7. Place each of the numbers 1 to 8 in the boxes below so that each row adds up to the same **total**.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

Total =

8. Numbers can be known as palindromes. For example, 77, 242, 12, 321, all *read the same forwards as they do backwards*.

   a. Circle the numbers that are palindromic:

       27   72   181   405   505   148,841

   b. Write down some 4-digit and 5-digit palindromic numbers.

   c. **Now try the following:**

- Write down any number that is more than one digit. **(e.g. 38)**

- Write down the number reversed beneath the first number. **(83)**

- Add the two numbers together. (38 + 83 = 121)

- 121 is indeed a palindrome.

- For some numbers you may need to repeat the process until you reach a palindrome.

Using the same steps:

i.   Try this with the number **27**.

ii.   Next try the number **49**. Continue to repeat the steps from 2-4 if needed until you reach a palindrome.

iii. Every time you go through steps 1 – 4 we call it a **stage**.

      Now try some other 2-digit numbers to find which one takes the most **stages** to get to a palindrome (**27** took 1 stage, **49** took 2 stages).

Unit 3 - Set C:

1. Write down as many ways as you can to add 4 odd numbers to get a total of 20.

   For example: 5 + 7 + 7 + 1.

2. Suzanna had a pack of 20 cards numbered from 1 to 20. She arranged the cards into 6 unequal piles where each pile added to the same total. What was the total and how could this be done?

3. A computer has developed a problem with printing out certain numbers in the following sums. The operator decided to use a jigsaw symbol (🧩) to help set out the sums.
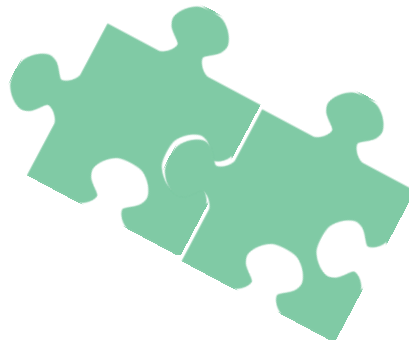
   Help the operator solve the problem by completing these calculations to find out the digit each 🧩 represents.

   a.
   ```
       🧩  2  2  🧩
   +   1  🧩 🧩  1
   ─────────────────
       3  4  8  9
   ```

   b.
   ```
       4  🧩 🧩  2
   -   🧩  3  5  🧩
   ─────────────────
          1  2  1
   ```

   c.
   ```
       5  🧩 🧩  4
   -   🧩  5  0  🧩
   ─────────────────
       1  8  0  7
   ```

4. Each letter represents a different digit. If one letter is a certain number then all those letters equal that number. What are the values of each letter?

We'll give you a start! The letter 'E' stands for the number '5'.

```
    S   E   N   D
+   M   O   R   E
─────────────────
M   O   N   E   Y
─────────────────
```

5. Place any of the following numbers in the circles below so that each line adds up to 24. You can only use each number once.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
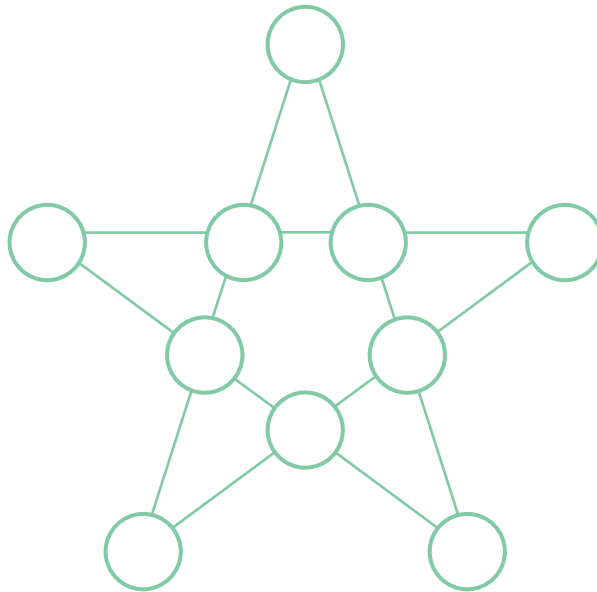
6. Number pyramids work by adding the two numbers below to make the new number above.

Take this pyramid.

6 + 3 = 9

4 + 2 = 6

2 + 1 = 3
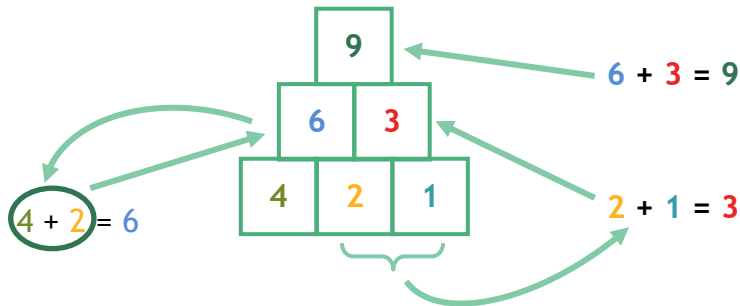
Complete the following pyramids.

a.

2 4 1

b.

9

5 1

c.

19

11

5

1

7. Place each of the numbers 1 to 12 in the **circles** below so that each **line** and the inner hexagon adds up to 26.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

8. Numbers can be known as **palindromes**. For example, 77, 242, 12,321, all *read the same forwards as they do backwards.*

   a. Circle the numbers that are palindromic:

   27   72   181   405   505   148,841

   b. Write down some 4-digit and 5-digit palindromic numbers.

   c. **Now try the following:**

   - Write down any number that is more than one digit. **(e.g. 38)**

   - Write down the number reversed beneath the first number. **(83)**

   - Add the two numbers together. (38 + 83 = 121)

   - 121 is indeed a palindrome.

   - For some numbers you may need to repeat the process until you reach a palindrome.

Using the same steps:

   i. Try this with the number **27**.

  ii. Next try the number **49**. Continue to repeat the steps from 2-4 if needed until you reach a palindrome.

 iii. Every time you go through steps 1 – 4 we call it a **stage**.

Now try some other 2-digit numbers to find which one takes the most **stages** to get to a palindrome. (**27** took 1 stage, **49** took 2 stages)

Unit 3 – Answers
Addition and subtraction problems
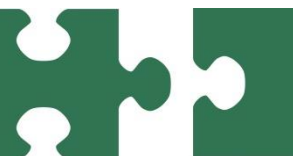
For progression, the questions more or less follow alphabetically e.g.: A-Q1 → B-Q1

The following hints or tips can be given to help give the children a start. Children enjoy and learn quite quickly from each other if templates are made and numbers cut out so that they can easily move them around.

- Set A Q5 - ask pupils to add the numbers up. Divide the total by 5 to get each pile total.
- Set A Q7 – give pupils the position of '1' and '8'.
- Set B Q2 – encourage looking for different combinations of the same digits (1123, 1213, … etc).
- Set B Q5 – let pupils know that the corners are added twice. Once a line-total is achieved, we can swap the centre numbers for one of the corner ones.
- Set B Q6 – get the highest ('14') total first.
- Set B Q7 - give pupils the position of '1' and '12'.
- Set C Q2 – establish that each pile adds up to 210 ÷ 5 = 35.
- Set C Q4 – ask the pupils what the M must stand for (encourage 'carry-overs').
- Set C Q5 - give pupils the position of '1' and '12'.
- Set C Q7 - give pupils the position of '1' and '12'.

Whole class examples:

1. Fill in the gaps [S]:

    a.   9 + | 21 | = 30   b.   51 + | 49 | = 100

    c.   350 + | 650 | = 1000   d.   60 - | 47 | = 13

    e. | 62 | - 25   = 37   f. | 3650 | - 1650 = 2000

2. The digits in the 2-digit number 23 add up to give 5 (2 + 3 = 5).
    How many other numbers have digits that add up to 5? They must not have any zeros.
    [S]

2-digit	14 and 41; 23 and 32
3-digit	122, 212, 221, 113, 131, 311
4-digit	1112, 1121, 1211, 2111
5-digit	11,111

3. Use any whole numbers as many times as you like to make each line of the rectangle
    add up to 10. [C]

    1 — 2 — 3 — 4

    8   4

    1 — 6 — 1 — 2
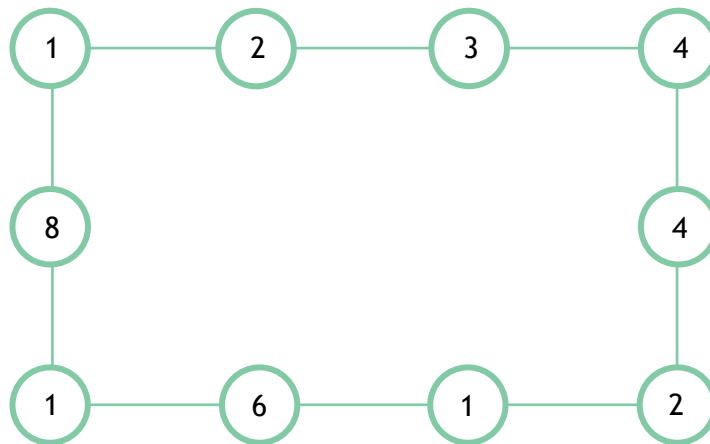
4. Kerry had a pack of 15 cards numbered from 1 to 15. She arranged the cards into 5
    unequal piles where each pile added to the same total. What was the total and how
    could this be done? [E]

    1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15 = 120
    120 ÷ 5 = 24 . . . so each pile adds up to 24

    Here is one way:

    | 15 + 9 | | 14 + 10 | | 13 + 11 | | 12 + 8 + 4 | | 7 + 6 + 5 +3 + 2 + 1 |

Unit 3 - Set A: Answers

1.

    a.   7 + [13] = 20

    b.   31 + [69] = 100

    c.   650 + [350] = 1000

    d.   30 - [13] = 17

    e.   [60] - 24 = 36

    f.   [3450] - 1450 = 2000

2.

2-digit	15 and 51; 24 and 42; 33
3-digit	123, 132, 213, 231, 321 and 312; 114, 141 and 411.
4-digit	1113, 1131, 1311 and 3111; 1122, 1212, 1221, 2211, 2112 and 2121.
5-digit	11,112, 11,121, 11,211, 12,111 and 21,111.
6-digit	111,111.

3.

(1 + 3 + 5 + 1 = 10)
1 + 3 + 3 + 3 = 10
1 + 1 + 1 + 7 = 10

4.
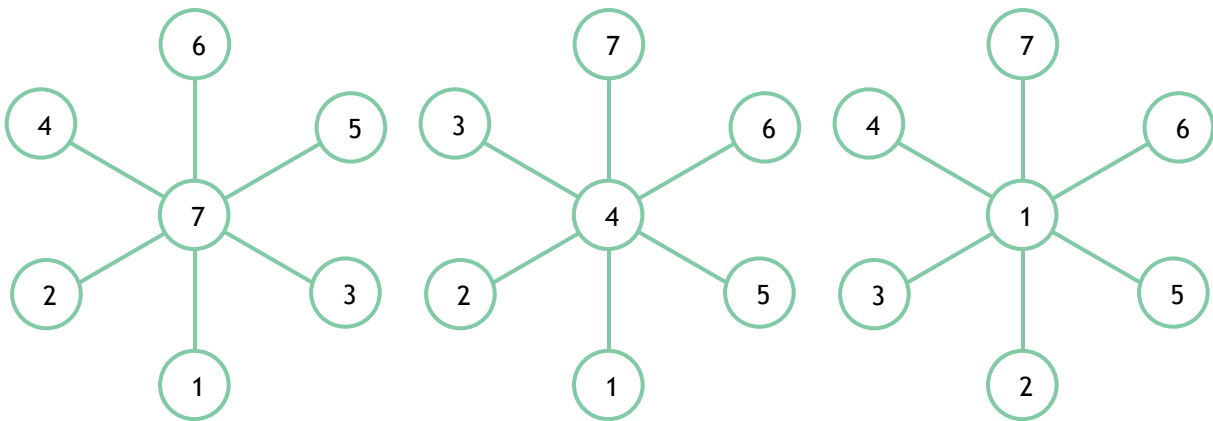
5.

> $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45$ . . .
> $45 \div 5 = 9$ . . . so each pile adds up to 9.
>
> | 9 | | 1 + 8 | | 2 + 7 | | 3 + 6 | | 4 + 5 |

6. a.

b.

3	—	8	—	1
7		**Total = 12**		5
2	—	4	—	6
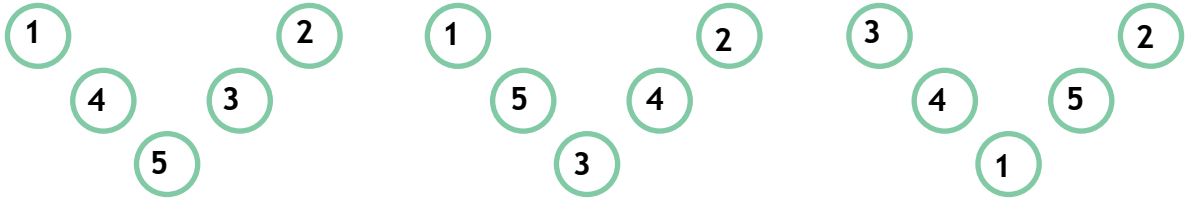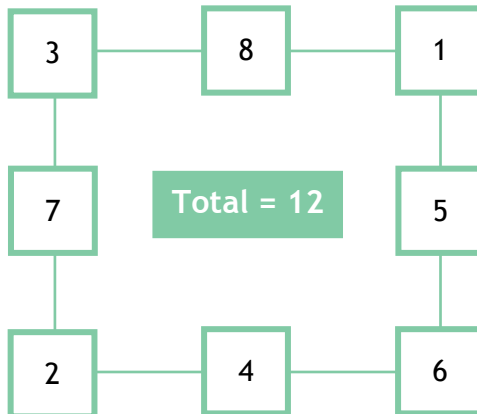
7.

a. 27   72   ⟨181⟩   405   ⟨505⟩   ⟨148,841⟩

b. **just a few …**
1441 4994 2002 5775 32,123 14,741 20,402 45,654 94,349 …

c. i.

step 1	**27**
step 2	**72**
step 3	**99** (27 + 72)
step 4	**99** is a palindrome (**1 stage**)

ii.

step 1	**49**
step 2	**94**
step 3	**143** (49 + 94)
step 4	**143** is not a palindrome (**1 stage**)
step 2	**341**
step 3	**484** (143 + 341)
step 4	**484** is a palindrome (**2 stages**)

iii.

	Stage 1			Stage 2		Stage 3		Stage 4		Stage 5		Stage 6	
63	63	36	**99**										
67	67	76	143	341	**484**								
68	68	86	154	451	605	506	**1111**						
78	78	87	165	561	726	627	1353	3531	**4884**				
79	79	97	176	671	847	748	1595	5951	7546	6457	14,003	30,041	**440,044**

Unit 3 - Set B: Answers

1.

a.	17 + **33** = 50		b.	431 + **569** = 1000	
c.	4650 + **5350** = 10,000		d.	300 - **175** = 125	
e.	**671** - 148 = 523		f.	**10,420** - 8420 = 2000	

2.

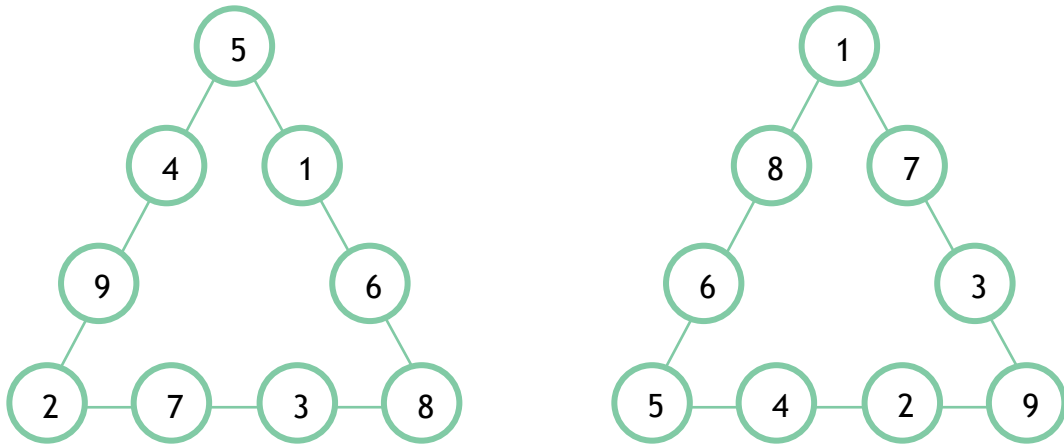| 2-digit	27 and 72; 18 and 81; 36 and 63; 45 and 54
3-digit	234, 243, 324, 342, 423 and 432; 135, 153, 315, 351, 513 and 531; 126, 162, 216, 261, 612 and 621; 117, 171 and 711; 225, 252 and 522; 144, 414 and 441; 333.
4-digit	1116, 1161, 1611 and 6111; 1125, 1152, 1215, 1251, 1512, 1521, 2115, 2151, 2511, 5112, 5121 and 5211; 1134, 1143, 1314, 1341, 1413, 1431, 3114, 3141, 3411, 4113, 4131 and 4311; 1233, 1323, 1332, 2133, 2313, 2331, 3123, 3132, 3213, 3231, 3312 and 3321.
5-digit	11,115, 11,151, 11,511, 15,111 and 51,111; 11,124, 11,142, 11,214, 11,241, 11,412, 11,421, 12,114, 12,141, 12,441, 14,112, 14,121, 14,211, 21,114, 21,141, 21,411, 24,111, 41,112, 41,121, 41,211, 42,111 (20); 11,223, 11,232, 11,322, 12,123, 12,132, 12,213, 12,231, 13,122, 13,212, 13,221, 21,123, 21,132,... 31,122,... 32,211 (60 in all); 12,222, 21,222, 22,122, 22,212 and 22,221; 11,133, 11,313, 11,331, 13,113, 13,131, 13311, 31,113, 31,131, 31,311, 33,111.
6-digit	111,114, 111,141, 111,411, 114,111, 141,111 and 411,111; 111,123, 111,132,... 211,113, 211,131,... 311,112, 311,121...(30 in all); 111,222, 112,122, 112,212, 112,221, 121,122, 121,212, 121,221, 122,112, 122,121, 122,211,... 211,122, 211,211,... 222,111(20 in all).
7-digit	1,111,113, 1,111,131, 1,111,311, 1,113,111, 1,131,111, 1,311,111 and 3,111,111; 1,111,122, 1,111,212,... 2,111,112, 2,111,211,... 2,211,111 (21 in all).
9-digit	111,111,111.

3.

1+3+5+1 = **10** 1+3+3+3 = **10** 1+1+1+7 = **10**	1+1+1+17 = **20** 1+1+3+15 = **20** 1+1+5+13 = **20** 1+1+7+11 = **20** 1+1+9+9 = **20**	1+3+5+11 = **20** 1+3+7+9 = **20** 1+3+3+13 = **20**	1+5+7+7 = **20** 1+5+5+9 = **20**	3+5+5+7 = **20** 3+3+5+9 = **20** 3+3+7+7 = **20** 3+3+3+11 = **20** 5+5+5+5 = **20**

4.

```
        5
      4   1
    9       6
  2   7   3   8
```

```
        1
      8   7
    6       3
  5   4   2   9
```

5. One example of multiple solutions:

```
  1 —— 14 —— 3 —— 2
  |                |
  15               9
  |                |
  4 —— 2 —— 5 —— 9
```
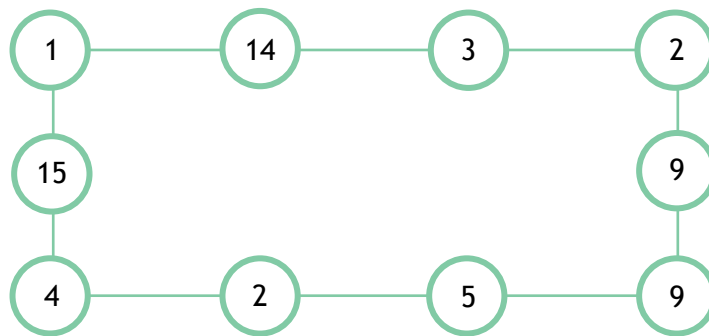
6.

7 = 4 + 3; 8 = 0 + 8; 13 = 7 + 6; 14 = 9 + 5; 3 = 1 + 2
7 = 7 + 0; 8 = 5 + 3; 13 = 9 + 4; 14 = 8 + 6; 3 = 1 + 2

7.

```
  3 —— 8 —— 1
  7  Total = 12  5
  2 —— 4 —— 6
```

```
  3 —— 8 —— 1
  7  Total = 12  5
  2 —— 4 —— 6
```

```
  4 —— 2 —— 8
  7  Total = 14  1
  3 —— 6 —— 5
```

```
  6 —— 1 —— 8
  2  Total = 15  4
  7 —— 5 —— 3
```

8.
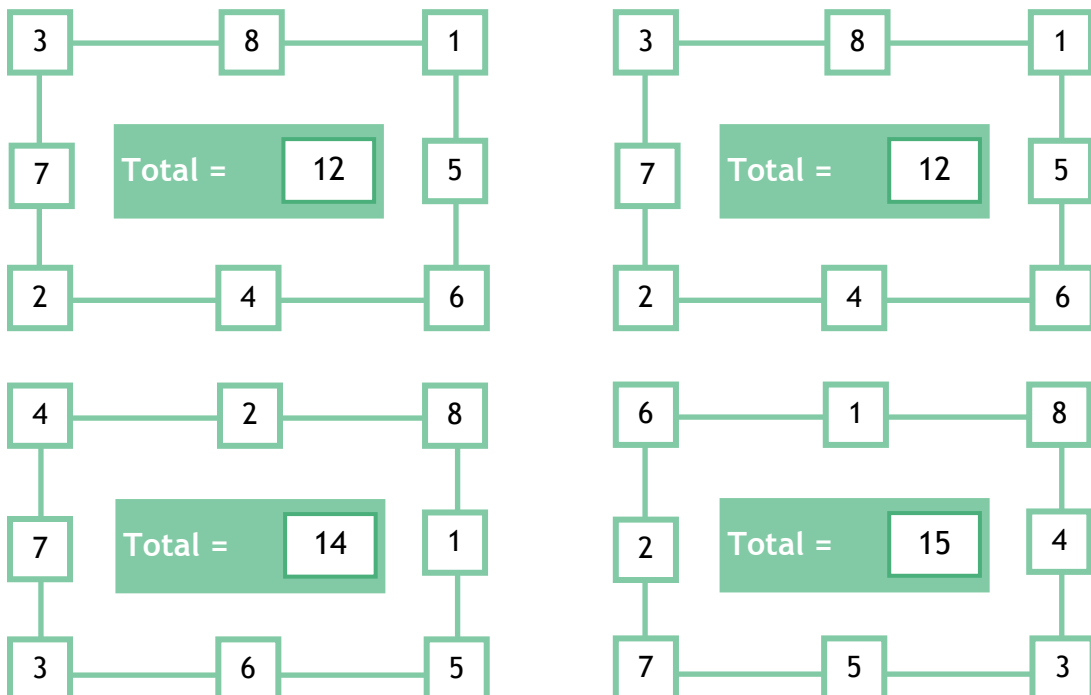
a.   27   72   (181)   405   (505)   (148,841)

> **Just a few ...**
> 1441 4994 2002 5775 32,123 14,741 20,402 45,654 94,349 ...

b. i.

step 1	**27**
step 2	**72**
step 3	**99** (27 + 72)
step 4	**99** is a palindrome (**1 stage**)

ii.

step 1	**49**
step 2	**94**
step 3	**143** (49 + 94)
step 4	**143** is not a palindrome (**1 stage**)
step 2	**341**
step 3	**484** (143 + 341)
step 4	**484** is a palindrome (**2 stages**)

iii.

	Stage 1			Stage 2		Stage 3		Stage 4		Stage 5		Stage 6	
63	63	36	**99**										
67	67	76	143	341	**484**								
68	68	86	154	451	605	506	**1111**						
78	78	87	165	561	726	627	1353	3531	**4884**				
79	79	97	176	671	847	748	1595	5951	7546	6457	14,003	30,041	**440,044**

Unit 3 - Set C: Answers

1.

1+1+1+17 = **20** 1+1+3+15 = **20** 1+1+5+13 = **20** 1+1+7+11 = **20** 1+1+9+9 = **20**	1+3+5+11 = **20** 1+3+7+9 = **20** 1+3+3+13 = **20**	1+5+7+7 = **20** 1+5+5+9 = **20**	3+5+5+7 = **20** 3+3+5+9 = **20** 3+3+7+7 = **20** 3+3+3+11 = **20** 5+5+5+5 = **20**

2.

1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + ... +18 + 19 + 20 = 210 . . .

210 ÷ 6 = 35 . . . so each pile adds up to 35.

Here is one way:

| 20 + 15 | 19 + 16 | 18 + 17 | 14 + 13 + 8 | 12+11+10+ 2 | 9+7+6+5+4+3+1 |

3.

a.
```
      2   2   2   8
  +   1   2   6   1
  ─────────────────
      3   4   8   9
```

b.
```
      4   4   7   2
  -   4   3   5   1
  ─────────────────
          1   2   1
```

c.
```
      5   3   1   4
  -   3   5   0   7
  ─────────────────
      1   8   0   7
```

4.

If E = 5, then M = 1 because the carry-over from the addition of S + M cannot be greater than one ten.

Therefore, S must be 9 (because 9+1 = 10). This means that O = 0.

N must therefore be the result of a 'carry over 10' because 5 + 0 = 5 (i.e. E), so it must be 6.

If 6 + R = 15 that would mean R = 9 which is letter S so R must be 8 with a carry-over from the first column.

D must therefore be either 6, 7, 8 or 9. 6 is N, 8 is R and 9 is S so that means D is 7. Finally, 7 + 5 = 12 so Y is 2.

```
      S   E   N   D              S   5   N   D
  +   M   O   R   E          +   1   O   R   5
  M   O   N   E   Y          1   O   N   5   Y
```

```
      S   E   N   D              9   5   N   D
  +   M   O   R   E          +   1   0   R   5
  M   O   N   E   Y          1   0   N   5   Y
```

```
      S   E   N   D              9   5   6   D
  +   M   O   R   E          +   1   0   R   5
  M   O   N   E   Y          1   0   6   5   Y
```

```
      S   E   N   D              9   5   6   D
  +   M   O   R   E          +   1   0   8   5
  M   O   N   E   Y          1   0   6   5   Y
```

```
      S   E   N   D              9   5   6   7
  +   M   O   R   E          +   1   0   8   5
  M   O   N   E   Y          1   0   6   5   2
```

5.

6.

a.	b.	c.

a.
```
      11
    6    5
  2    4    1
```

b.
```
      14
    9    5
  5    4    1
```

c.
```
          19
        8    11
      3    5    6
    1    2    3    3
```

7.

8.

a.

27   72   **(181)**   405   **(505)**   **(148,841)**

b.
> **Just a few …**
> 1441 4994 2002 5775 32,123 14,741 20,402 45,654 94,349 …

c.

i.

step	value
step 1	**27**
step 2	**72**
step 3	**99** (27 + 72)
step 4	**99** is a palindrome (**1 stage**)

ii.

step	value
step 1	**49**
step 2	**94**
step 3	**143** (49 + 94)
step 4	**143** is not a palindrome (**1 stage**)
step 2	**341**
step 3	**484** (143 + 341)
step 4	**484** is a palindrome (**2 stages**)

iii.

	Stage 1			Stage 2		Stage 3		Stage 4		Stage 5		Stage 6	
63	63	36	**99**										
67	67	76	143	341	**484**								
68	68	86	154	451	605	506	**1111**						
78	78	87	165	561	726	627	1353	3531	**4884**				
79	79	97	176	671	847	748	1595	5951	7546	6457	14,003	30,041	**440,044**

	The following are the stages for 89:
a.	89 + 98 = 187
b.	187 + 781 = 968
c.	968 + 869 = 1837
d.	1837 + 7381 = 9218
e.	9218 + 8129 = 17,347
f.	17,347 + 74,371 = 91,718
g.	91,718 + 81,719 = 173,437
h.	17,3437 + 73,4371 = 907,808
i.	907,808 + 808,709 = 1,716,517
j.	1716517 + 7156171 = 8,872,688
k.	8872688 + 8862788 = 17,735,476
l.	17735476 + 67453771 = 851,89,247
m.	85189247 + 74298158 = 159,487,405
n.	159487405 + 504784951 = 664,272,356
o.	664272356 + 653272466 = 1,317,544,822
p.	1317544822 + 2284457131 = 3,602,001,953
q.	3602001953 + 3591002063 = 7,193,004,016
r.	7193004016 + 6104003917 = 13,297,007,933
s.	13297007933 + 33970079231 = 47,267,087,164
t.	47267087164 + 46178076274 = 93,445,163,438
u.	93445163438 + 83436154439 =s 176,881,317,877
v.	176881317877 + 778713188671 = 955,594,506,548
w.	955594506548 + 845605495559 = 1,801,200,002107
x.	1801200002107 + 7012000021081 = 8,813,200,023,188

Unit 4 -
Addition and subtraction – checking and money

In this unit, you will:

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Whole class examples:

1. Put all the digits in the box to complete the following sums: [S]

   a. 9, 3 and 5

   ☐☐ + ☐ = 62

   b. 3, 8 and 4

   ☐☐ - ☐ = 79

2. Susan enters a shop and buys two garments costing £16 and £25. She has £40 to spend. Does she have enough money to buy both garments? [S]

3. Put all the digits in the box to complete the following sums: [C]

   a. 2, 3, 5 and 8

   ☐☐ - ☐☐ = 58

   b. What could the numbers be?

   70 - ☐ - ☐ = 27

4. Here is an addition calculation: [C]

   134,500 + 65,500 = 200,000

   Circle the one calculation which has **not** been correctly worked out from this fact:

   a. 2000 – 655 = 1345

   b. 200,000 – 134,500 = 65,500

   c. 200,000 + 65,500 = 134,500

   d. 20,000 – 6550 = 13,450

5. Choose digits to write into the spaces below to complete the sum: [E]

☐ ☐ 2 + ☐ 6 5 = 537

6. A family of four want to go to the cinema. The family ticket costs £23.99. Their bus fare comes to £12.80 and a snack comes to £10.30. David, the father, has £50 in cash. Using estimation, does he have enough money for the whole trip? [E]

Unit 4 – Set A:

1. Put all the digits in the box to complete the following sums.

   a. 9, 3 and 5

   ☐☐ + ☐ = 62

   b. 3, 8 and 4

   ☐☐ - ☐ = 79

   c. 7, 4 and 3

   ☐☐ + ☐ 1 = 78

   d. 6, 1 and 8

   ☐☐ - ☐ = 75

2. Write four digits in the boxes. Put one digit in each box.

   ☐☐ + ☐☐ = 76

3. Give three possible solutions to the following sum:

   ☐ + ☐ + ☐ = 8000

   ☐ + ☐ + ☐ = 8000

   ☐ + ☐ + ☐ = 8000

4. a. Connect the estimated sum to the correct sum with a straight line.

   The first one is done for you.

Actual Sum	Estimated
278 + 804 =	4200 + 3000
4173 + 2904 =	380 - 130
371 – 128 =	21,000 + 8000
8071 – 2513 =	1000 + 100
21,399 + 7816 =	8000 – 3000
	300 + 800

b. There is one estimated sum not connected.

    i.   Make up your own sum that would round to this.

    ii.   Write down the answer to your sum.

5. Sophie and Robin have some biscuits. Altogether they have 14 biscuits.
Sophie has 2 more biscuits than Robin. How many biscuits do Sophie and Robin each have?

6. Mark has 83 stamps. Ella has 59 stamps.

a. Circle the option that is the best way to estimate how many stamps there are altogether.

    a.   90 + 60 = 150   b.   80 + 60 = 140   c.   80 + 50 = 130

b. Mark collects all the stamps together. How many stamps do they have altogether?

7. You have several of each of the following coins: 1p, 2p, 5p, 10p, 20p and 50p.

a. Which coins do I use to spend:

    i.   **45p** using 4 coins?

    ii.   **45p** using 5 coins?

    iii.   **£1** using 4 coins?

b. Write down the fewest number of coins needed to make the following totals:

    i.   **7p**

    ii.   **18p**

    iii.   **36p**

8. Look at the following car prices.

a. £5280	b. £8731	c. £2234
d. £2218	e. £3451	f. £4935

Answer the following questions:

a. Which is the cheapest car to buy?

b. Which two cars could you buy for £5000?

c. Joe pays £2240 for car D. How much change does he get back?

d. Garry's Garage wants to buy **three** of these cars to sell on their forecourt. Which three could they buy if they had **£10,000** to spend?

There may be more than one way to do this.

Unit 4 - Set B:

1. Put all the digits in the box to complete the following sums.

    a. 8, 2, 6 and 5

    ☐☐ + ☐☐ = 84

    b. 7, 8, 1 and 4

    ☐☐ + ☐☐ = 65

    c. 9, 2, 6 and 4

    ☐☐ - ☐☐ = 27

    d. 3, 8, 5 and 4

    ☐☐ - 49 = ☐☐

2. **a.** Connect the estimated sum to the correct sum with a straight line.
    The first one is done for you.

Actual Sum	Estimated
278 + 804 =	4200 + 3000
4173 + 2904 =	380 - 130
371 – 128 =	21,000 + 8000
8071 – 2513 =	1000 + 100
21,399 + 7816 =	8000 – 3000
	300 + 800

   b. There is one estimated sum not connected.

   i.   Make up your own sum that would round to this.

   ☐

   ii. Write down the answer to your sum.

   ☐

3. Here are five digit cards

| 2 | 3 | 4 | 5 | 6 |

Use all the cards once to make this sum correct.
Find two different ways to do it below.

a.

☐☐
☐☐
+ ☐

1 1 0

b.

☐☐
☐☐
+ ☐

1 1 0

4. Mary and David each have some money. Altogether they have £1.30.
Mary gives David 10p so that they both have the same amount. How much money did each have at the start?

5. A stationery store normally sells 11,876 trading cards per month. In August, the store sold a total of 21,977 trading cards. How many more trading cards did the stationery store sell in August compared with a normal month?

6. A rope bridge can just hold a total weight of 230 kg. Three adults come to cross the bridge. Here are their weights:

Stevie	89 kg	Joey	74 kg	Mandy	68 kg

a. Mandy thinks that they will all be able to get across together. Is she correct?

b. Joey disagrees. They would only be able to do this if they rounded their weights to the nearest 10 kg. Is he correct?

7. Three good friends have been reading books from their local library. Alex has read six books. Ben has read seven books and Carly has read eight books. One popular book was read by all three friends, but the rest were all different.

How many different books were read altogether?

8. Look at the following car prices:

a. £5280	b. £8731	c. £2234
d. £2218	e. £3451	f. £4935

Answer the following questions:

a. Which two cars could you buy for £5000?

b. Joe pays £4000 for car E. How much change does he get back?

c. Which would cost more: buying both cars A and E or buying car B? How much more?

d. Garry's Garage wants to buy **three** of these cars to sell on their forecourt. Which three could they buy if they had **£10,000** to spend?
There may be more than one way to do this.

Unit 4 - Set C:

1. Put 4 of the five digits in the box to complete the following sums:

   a. 8, 2, 6, 1 and 5

   ☐☐ + ☐☐ = 84

   b. 7, 8, 1, 9 and 4

   ☐☐ + ☐☐ = 65

   c. 9, 2, 6, 5 and 4

   ☐☐ - ☐☐ = 27

   d. 3, 8, 5, 2 and 4

   ☐☐ - 49 = ☐☐

2. Three good friends have been reading books from their local library. Alex has read six books. Ben has read seven books and Carly has read eight books.

   One popular book was read by all three friends, but the rest were all different.

   How many different books were read altogether?

3. A family of four want to go to a theme park. The family ticket costs £69.99. Their parking came to £8.50 and lunch comes to £24.30. David, the father, estimated that it would cost him less than £100, which he thought was a great price for an excellent day's outing.

   a. Was David right about his estimate?

   b. Find the difference between his estimate and the actual price.

4. Using only the digits **9** and **1**, fill in the spaces to make the answer to the sum equal 201.

   ⬜⬜ + ⬜⬜ + ⬜⬜ = 201

   Can you find another way of doing this?

5. A cup of coffee costs 40 pence more than a cup of tea at a local cafe. Harley buys one cup of coffee and one cup of tea and pays £3.

   How much did the cup of coffee cost?

6. A rope bridge can just hold a total weight of 230 kg. Three adults come to cross the bridge. Here are their weights:

Stevie	89.1 kg	Joey	74.7 kg	Mandy	68.5 kg

   a. Mandy thinks that they will all be able to get across together. Is she correct?

   b. Joey disagrees. They would only be able to do this if they rounded their weights to the nearest 10 kg. Is he correct?

7. Two friends have been discussing the effects of rounding. They decide to choose two **2-digit** numbers and add them but use different methods.
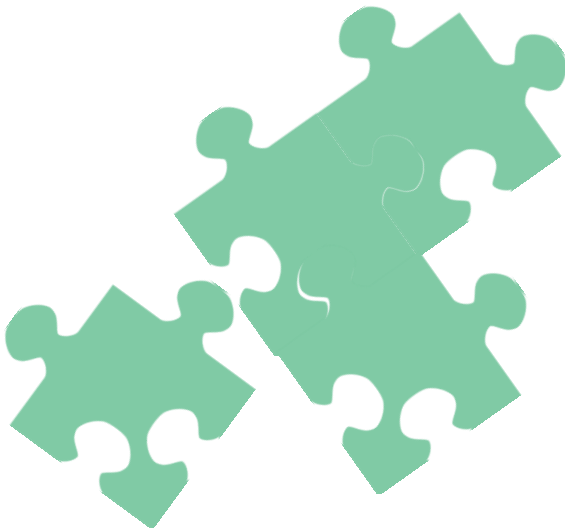
Tom	Will
1. Add the two numbers 2. Round the answer to the nearest 10	1. Round the two numbers to the nearest 10. 2. Add these two answers

Tom says, 'My answer will always be greater than yours.'
Is he right? Investigate this by trying two numbers of your own.

8. Look at the following car prices:

a. £5280	b. £8731	c. £2234
d. £2218	e. £3451	f. £4935

Answer the following questions:

a. Joe pays £4000 for car **E**. How much change does he get back?

b. Which would cost more: buying both cars **A** and **E** or buying car **B**? How much more?

c. Garry's Garage wants to buy **three** of these cars to sell on their forecourt. Which three could they buy if they had **£10,000** to spend? There may be more than one way to do this.

d. Jess says, "The total value of these cars is less than £26,000." Is she correct? Use estimation to prove your answer.

Unit 4 – Answers:
Addition and subtraction – checking and money

For progression, children can be guided as follows:

Support	Core
Set A – Q1-Q3 → Set B – Q1 Set A - Q4 → Set B – Q2 Set A - Q5 → Set B – Q4	Set B - Q1 → Set C – Q1 Set B - Q4 → Set C – Q5 Set B – Q6 → Set C – Q6
Questions A-Q8, B-Q8 and C-Q8 all relate to the same topic	

Most of these questions involve a little 'trial and improvement'. Discussions can take place between the children as a class, in groups or in 1:1 sessions. Where rounding is involved, the choice of 'what to round to' can be left to the children.

Further hints/tips are listed below.

- Set A Q1 and 2 can be simplified by giving them the 'ones' digit.
- Set A Q4 – give children one number to start and even suggest 'what rounds to…?'.
- Set A Q5 – issue 14 counters and ask the children to investigate how it works…
- Set A Q7 is better dealt with in small groups.
- Set B Q1 can be simplified by giving any one digit.
- Set B Q3 – ask what the three 'ones' digits must be.
- Set B Q4 – could refer back to Set A Q5 (above) to start with to get the method.
- Set B Q7 – similar to Set B Q4 (understanding that they shared one book but this amounts to three books in total).
- Set C Q1 as in Set B Q1; give children one of the digits.
- Set C Q2 and Set C Q5 as in Set A Q5 and Set B Q4 above.
- Set C Q7 give children a pair of numbers to start with but encourage further choices of their own.
- Set A Q8, Set B Q8 and Set C Q8 can be done collectively.

Whole class examples:

1.

a. 9, 3 and 5

| 5 | 3 | + | 9 | = 62 |

| 5 | 9 | + | 3 | = 62 |

b. 3, 8 and 4

| 8 | 3 | - | 4 | = 79 |

2.

£16 + £25 = £41. No, £40 is not enough.

3.

a.

| 8 | 3 | - | 2 | 5 | = 58 |

b.

| 70 | - | 20 | - | 23 | = 27 |

Any two numbers that add up to 43!

4.

a. 2000 – 655 = **1345**   [÷ by 10]

b. 200000 – 134500 = **65500**   [× by 100]

c. 200000 + 65500 = **134500**

d. 20000 – 6550 = **13450**   [as above]

5.

| 2 | 7 | 2 | + | 2 | 6 | 5 | = **537** |

The hundreds digits have to add up to 4 … 172 + 365; 372 + 165 will work too.

6.

Total = £23.99 + £12.80 + £10.30 = £47.09. **Yes,** £50 will be enough.

Estimating by rounding would give 24 + 13 + 10 = 47

Unit 4 - Set A: Answers

1.

a.
| 5 | 3 | + | 9 | = 62 |
| 5 | 9 | + | 3 | = 62 |

b. | 8 | 3 | - | 4 | = 79

c.
| 4 | 7 | + | 3 | 1 | = 78 |
| 4 | 1 | + | 7 | = 78 |

d. | 8 | 1 | - | 6 | = 75

2. One example is: | 4 | 7 | + | 2 | 9 | = 76

Others are: 43 + 33 = 76; 52 + 24 = 76; 34 + 42 = 76; 66 + 10 = 76…

3. Examples include:

> 4000 + 3000 + 1000 = 8000; 4000 + 2000 + 2000 = 8000;
> 6500 + 1000 + 500 = 8000; 4500 + 2500 + 1000 = 8000

4. a.

Actual Sum	Estimated
278 + 804 =	4200 + 3000
4173 + 2904 =	380 - 130
371 – 128 =	21,000 + 8000
8071 – 2513 =	1000 + 100
21,399 + 7816 =	8000 – 3000
	300 + 800

b. The sum is 1000 + 100. Possible answers range between the following:

| i. | 950 + 95 = 1000 + 100 (nearest 10); 1049 + 62 = 1000 + 100 (nearest 100); 1043 + 102 = 1000 + 100 (nearest 10); 976 + 146 = 1000 + 100 (nearest 100)… |
| ii. | Answers will vary |

5.

> Give Sophie her two extra biscuits. Then share out the remainder equally.
> 14 – 2 = 12; 12 ÷ 2 = 6.
> Sophie has eight biscuits, Robbie has six.

a.

| a. 90 + 60 = 150 | b. ⬭80 + 60 = 140⬭ | c. 80 + 50 = 130 |

b.

| 83 + 59 = **142** |

6.

a.

i.	45p = 20p + 10p + 10p + 5p
ii.	45p = 20p + 20p + 2p + 2p + 1p = 20p + 10p + 5p + 5p + 5p
iii.	£1 = 50p + 20p + 20p + 10p

b.

i.	7p = 5p + 2p (two coins)
ii.	18p = 10p + 5p + 2p + 1p (four coins)
iii.	36p = 20p + 10p + 5p + 1p (four coins)

7.

a.	D: **£2218**
b.	C and D = 2234 + 2218 = **£4452** (<£5000)
c.	£2240 - £2218 = **£22 change**
d.	C + D + E = £2234 + £2218 + £3451 = **£7903** **C + D + F** = £2234 + £2218 + £4935 = **£9387** A + C + D = £5280 + £2234 + £2218 = **£9732**

Unit 4 – Set B: Answers

1.

a. | 5 | 6 | + | 2 | 8 | = 84   b. | 4 | 7 | - | 1 | 8 | = 65

c. | 6 | 9 | - | 4 | 2 | = 27   d. | 8 | 4 | - 49 = | 3 | 5 |

2. a.

Actual Sum	Estimated
2781 + 8047 =	40,0000 + 40,000
14,173 + 4904 =	380 – 130
371 – 128 =	14,000 + 5000
48,071 – 32,513 =	1000 + 100
42,1399 + 37,816 =	48,000 – 33000
	2800 + 8000

b. The sum is 1000 + 100. Possible answers range between the following:

i.	950 + 95 = 1000 + 100 (nearest 10); 1049 + 62 = 1000 + 100 (nearest 100); 1043 + 102 = 1000 + 100 (nearest 10); 976 + 146 = 1000 + 100 (nearest 100)…
ii.	Answers will vary

3. Some possible answers include:

4	3		4	3		4	2
6	5		6	2		6	3
+	2		+	5		+	5
1	1	0	1	1	0	1	1	0

4	5		4	5		6	5
6	2		6	3		4	2
+	3		+	2		+	3
1	1	0	1	1	0	1	1	0

4.

> **£1.30 ÷ 2 = £0.65 or 65p.**
> So, because Mary has 10p more, she must have **£0.75 (75p)** to start with and David must have **£0.55 (55p).**

5.

> 21,977 – 11,876 = **10,101 more in August.**

6.

a.	Total weight = 89 kg + 74 kg + 68 kg **= 231 kg. No (>230 kg)**
b.	Rounding … 90 kg + 70 kg + 70 kg = 230 kg. **Yes (=230 kg)**

7.

> Take out the popular book from each person's total (1 book).
> Alex has 6 – 1 = 5 books
> Ben has 7 – 1 = 6 books
> Carly has 8 – 1 = 7 books
> Total number of different books = 1 + 5 + 6 + 7 = **19 books**

8.

a.	C and D = 2234 + 2218 = **£4452** (<£5000)
b.	£4000 - £3451 = **£549 change**
c.	A + E = £5280 + £3451 = £8731 B = £8743 … so B costs **£12**
d.	C + D + E = £2234 + £2218 + £3451 = **£7903** C + D + F = £2234 + £2218 + £4935 = **£9387** A + C + D = £5280 + £2234 + £2218 = **£9732**

Unit 4 - Set C: Answers

1.

a. | 5 | 6 | + | 2 | 8 | = 84

| 5 | 8 | + | 2 | 6 | = 84

b. | 4 | 7 | + | 1 | 8 | = 65

| 4 | 6 | + | 1 | 9 | = 65

| 4 | 8 | + | 1 | 7 | = 65

| 4 | 9 | + | 1 | 6 | = 65

c. | 6 | 9 | - | 4 | 2 | = 27

| 9 | 2 | - | 6 | 5 | = 27

| 5 | 6 | - | 2 | 9 | = 27

d. | 8 | 4 | - 49 = | 3 | 5 |

2.

Alex has 6 – 1 = 5 books
Ben has 7 – 1 = 6 books
Carly has 8 – 1 = 7 books
Total number of different books = 1 + 5 + 6 + 7 = **19 books**

3.

a. Rounding to the nearest ten: £70 + £10 + £20 = **£100** (exactly £100)
Rounding to the nearest one: £70 + £9 + £24 = **£103** (>£100)
Actual: £69.99 + £8.50 + £24.30 = £102.79 **No** (>£100)

b. Difference = £102.79 - £100 = **£2.79**   [£103 - £102.79 = 21 pence]

4.

| 9 | 1 | + | 9 | 1 | + | 1 | 9 | = 201

| 9 | 9 | + | 9 | 1 | + | 1 | 1 | = 201

5.

Take out the 40p first. Then share out the remainder equally.
£3.00 – £0.40 = £2.60;   £2.60 ÷ 2 = £1.30
Tea costs £1.30, Coffee costs £1.70 (40p more)

6.

a.	Total weight = 89.1 kg + 74.5 kg + 68.5 kg = 232.1 kg. **No (>230 kg)**
b.	Rounding … 90 kg + 70 kg + 70 kg = 230 kg. **Yes (=230 kg)**

7.

Trial 1: try the numbers 58 and 36	
Tom	Will
1. 58 + 36 = 94 2. rounding (nearest 10) = 90	1. Rounding (nearest 10) gives 60 and 40 2. 60 + 40 = 100
90 is less than 100 so Tom is wrong!	

Trial 2: try the numbers 58 and 33	
Tom	Will
1. Tom 1. 58 + 33 = 91 2. rounding (nearest 10) = **90**	1. Rounding (nearest 10) gives 60 and 30 2. 60 + 30 = 90
90 is equal to 100 so Tom is wrong!	

Trial 3: try the numbers 58 and 42	
Tom	Will
1. 58 + 42 = 102 2. rounding (nearest 10) = 90	1. Rounding (nearest 10) gives 60 and 40 2. 60 + 40 = 100
90 is less than 100 so Tom is wrong!	

8.

a.	£4000 - £3451 = **£549 change**
b.	A + E = £5280 + £3451 = £8731 B = £8743 … so **B costs £12**
c.	C + D + E = £2234 + £2218 + £3451 = **£7903** C + D + F = £2234 + £2218 + £4935 = **£9387** A + C + D = £5280 + £2234 + £2218 = **£9732**
d.	Rounding to nearest 1000: £5000 + £9000 + £2000 + £2000 + £3000 + £5000 = **£26,000** Rounding to nearest 100: £5300 + £8700 + £2200 + £2200 + £3500 + £4900 = **£26,800** Actual price = £5280 + £8743 + £2234 + £2218 + £3451 + £4935 = **£26,861** **Overall cost is greater than £26,000**

Unit 5 –
Multiplication and division – factors and squares

⬦ In this unit, you will:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers

- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers

- solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes.

Remember the following:	
Prime number:	only has **2** factors (it won't divide by any number but 1 and itself) **e.g.** 17 = 1 × 17 only (prime); 18 = 1 × 18, 2 × 9, 3 × 6 (not prime).
Square number:	is the result of multiplying a number by itself. **e.g.** 4 × 4 = 16; 12 × 12 = 144 (16 and 144 are square numbers)

Whole class examples:

1. Write in the missing number to make the sum correct. [S]

   a. ☐ × 4 = 32   b. 7 × ☐ = 42

   c. 24 ÷ ☐ = 8   d. 45 ÷ ☐ = 9

2. Here is a list of numbers: [C]

   2   11   14   25   31   100

   Write down any of these numbers that is a:

a.	Prime number		b.	Square Number	
c.	Multiple of 7		d.	Factor of 100	

3. The number 13 can be written as the sum of two square numbers ... 4 + 9 = 13
   Write down any of these numbers as the 'sum of two squares': [E]

a.	17		b.	58	
c.	74		d.	106	

Unit 5 - Set A:

1. Write in the missing number to make the sum correct.

   a. ☐ × 3 = 27

   b. 6 × ☐ = 42

   c. ☐ × 3 = 27

   d. 9 ÷ ☐ = 18

   e. 24 ÷ ☐ = 3

   f. 27 ÷ ☐ = 9

   g. 36 ÷ ☐ = 9

   h. 48 ÷ ☐ = 6

2. Put all the digits in the box to complete the following multiplications:

   a. 1, 2 and 3

   ☐☐ × ☐ = 36

   b. 1, 2 and 3

   ☐☐ × ☐ = 62

   c. 2, 3 and 5

   ☐☐ × ☐ = 70

   d. 2, 4 and 5

   ☐☐ × ☐ = 90

3. Put all the digits in the box to complete the following multiplications:

   a. 2, 2 and 4

   ☐☐ ÷ ☐ = 8

   b. 3, 5 and 7

   ☐☐ ÷ ☐ = 5

   c. 4, 6 and 8

   ☐☐ ÷ ☐ = 8

   d. 2, 3 and 7

   ☐☐ ÷ ☐ = 9

4. The number 6 is not a *prime number* as its factors can be written as:

   6 = 1 × 6 **and** 6 = 2 × 3 (i.e. 4 factors in total)

   Since 6 has more than 2 factors, it is not prime.

   Write down all the factors of the following numbers:

   i.   10 (4 factors) ☐

   ii. 22 (4 factors) ☐

   iii. 12 (6 factors) ☐

   iv. 30 (8 factors) ☐

   v.   36 (9 factors) ☐

5. The first **five** multiples of 7 are:

   7, 14, 21, 28, 35 **(7 times table – counting up in 7s)**

   Complete the first five multiples of:

i.	Prime number:	
ii.	Multiple of 9:	
iii.	Multiples of 12:	

6. Here is a list of numbers:

3	**13**	**16**	**29**	**36**	**100**

   Choose any number from this list that is a:

a. Prime number	b. Square number
c. Multiple of 9	d. Factor of 18

7. Here are four numbered cards:

9	2	4	1

   Use two of these cards to complete the following,
   The first one has been done for you.

   Odd number: [2] [1].

a. Multiple of 6 [ ][ ]	b. Square number [ ][ ]
c. Factor of 72 [ ][ ]	d. Prime number [ ][ ]

8. Here are the first 10 square numbers:

   1 4 9 16 25 36 49 54 81 100

   'Any two square numbers can be chosen and **added** to give a new number'
   e.g. Choosing **4** and **100** gives 4 + 100 = **104.**

a. [ ] + [ ] = (13)	b. [ ] + [ ] = (25)
c. [ ] + [ ] = (29)	d. [ ] + [ ] = (52)

   e. Now see if you can make up your own sums using square numbers. Test them on your friends by only giving them the answers.

Unit 5 - Set B

1. Put all the digits in the box to complete the following multiplications:

   a. 1, 2 and 3

   ☐☐ × ☐ = 36

   b. 2, 5 and 6

   ☐☐ × ☐ = 130

2. Put all the digits in the box to complete the following multiplications:

   a. 2, 3 and 4

   ☐☐ ÷ ☐ = 8

   b. 3, 5 and 7

   ☐☐ ÷ ☐ = 5

3. Write in the missing digits to make this correct.

   a.
   ```
     ☐ 4 ☐
   ×     7
   ─────────
   2 3 9 4
   ```

   b. ☐ 8 × 8 ☐ = 3154

4. Write in the missing digits to make this correct.

   a. ☐☐ × ☐ = 210

   b. 420 ÷ ☐ = ☐☐

5. a. Write down all the factors of:

   i. 26 (4 factors)

   ii. 40 (4 factors)

   iii. 60 (?)

   iv. 90 (?)

   b. Can you find as many numbers that have an **odd** number of different factors? What can you say about these numbers?

6. 18 can be written in terms of factors as 2×9.

    9 can be written in terms of factors as 3×3.

    So, $18 = 2 \times 3 \times 3$. These are called its *prime factors* as they are all prime numbers.

    Write the following numbers in terms of their *prime factors*:

    a. 12

    b. 20

    c. 30

    d. 56

7. Here is a list of numbers:

    $$3 \qquad 13 \qquad 16 \qquad 29 \qquad 36 \qquad 100$$

    Choose any number from this list that is a:

    a. Prime number

    b. Square number

    c. Multiple of 9

    d. Factor of 18

    e. Product of two square numbers (two square numbers multiplied together)

    f. Sum of two square numbers (two square numbers added together)

8. 'A **cube** number is the result of multiplying any number by itself *three* times'.

    e.g. $4 \times 4 \times 4 = 64$; $12 \times 12 \times 12 = 1728$ (64 and 1728 are cube numbers).

    These are usually written in power form as $64 = 4^3$ ($4 \times 4 \times 4$).

    Copy and complete the pattern below. Then write down the next **two** steps.

    $1^3 = 1^2$

    $1^3 + 2^3 = 3^2$ $\qquad$ $(1 + 2 = 3)$

    $1^3 + 2^3 + 3^3 = 6^2$ $\qquad$ $(1 + 2 + 3 = 6)$

    $1^3 + 2^3 + 3^3 + \boxed{} = 10^2$

9. Copy and complete the pattern below. Then write down the next **two** steps.

   1                  $= 1 = 1^2$

   1 + 3 $= 4 = 2^2$

   1 + 3 + 5 $= 9 = \boxed{}^2$

   1 + 3 + 5 + 7 $\boxed{} = \boxed{}^2$

   1 + 3 + 5 + 7 + 9 $\boxed{} = \boxed{}^2$

10. 'Any two square numbers can be chosen and **added** to give a new number.'
    e.g. Choosing **4** and **100** gives 4 + 100 = **104.**
    Find the two square numbers that add to give the following:

    a. $\boxed{} + \boxed{} = \boxed{52}$ b. $\boxed{} + \boxed{} = \boxed{74}$

    c.   Now see if you can make up your own sums using square numbers. Test them on your friends by only giving them the answers.

Unit 5 - Set C:

1. Write in the missing digits to make this correct.

    a. ☐ ☐ × ☐ = 210

    b. 420 ÷ ☐ = ☐ ☐

2. Write in the missing digits to make this correct.

    a.
    ```
          ☐  4  ☐
      ×         7
      _____
       2  3  9  4
    ```

    b. ☐ 8 × 8 ☐ = 3154

3. Each different letter stands for a different number.
    What are the values of each letter?

    [Find out what digit (**X**) could multiply to give…*X]

    ```
          P  N  X
       ×     N  X
       _____
          R  N  X
       N  X  S  O
       _____
       Z  P  N  X
    ```

4. 18 can be written in terms of factors as 2×9.
    9 can be written in terms of factors as 3×3.
    So, $18 = 2 \times 3 \times 3$. These are called its *prime factors* as they are all prime numbers.

    Write the following numbers in terms of their *prime factors*:

    a. 20 ☐

    b. 50 ☐

    c. 90 ☐

    d. 126 ☐

5. Here is a list of numbers:

    3   13   16   29   36   100

    Choose any number from this list that is a:

    a. Square number

    b. Multiple of 9

    c. Factor of 96

    d. Product of **two** square numbers (two square numbers multiplied together)

| e. | Sum of **two** square numbers (two square numbers added together) | f. | **Two** of these numbers are chosen and one is subtracted from the other. Their difference is also a square number. What are these two numbers and what is the final square number? |

6. Find two square numbers whose sum is:

    a. 130   b. 160

    c. 585   d. 680

7. 376 is a multiple of 4 but not a multiple of 7.
406 is a multiple of 7 but not a multuple of 4.
Find a number that is **between** 376 and 402 that is a multiple of **both 4** and **7**.

8. 'A **cube** number is the result of multiplying any number by itself *three* times'.
e.g. $4 \times 4 \times 4 = 64$; $12 \times 12 \times 12 = 1728$ (64 and 1728 are cube numbers).
These are usually written in power form as $64 = 4^3$ $(4 \times 4 \times 4)$.

Copy and complete the pattern below. Then write down the next **two** steps.

$1^3 = 1^2$

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

$1^3 + 2^3 + 3^3 = 6^2$ $(1 + 2 + 3 = 6)$

$1^3 + 2^3 + 3^3 + \ldots \boxed{} = 10^2$

9. Copy and complete the pattern below. Then write down the next two steps.

$1^3 = 1^2 = 1$

$2^3 = (1 + 2)^2 - 1^2 = 8$

$3^3 = (1 + 2 + 3)^2 - (1 + 2)^2 = 27$

$4^3 = (1 + 2 + 3 + 4)^2 - (1 + 2 + \ldots)^2$

10. Jasmine shows Jenny a square number trick. She asks Jenny to do the following:

'Take two square numbers. Add them together. You get another square number.'

Jenny tries 9 and 25	…. 9 + 25 = 34 [which is not a square number]
Jasmine says 'Try 9 and 16'	…. 9 + 16 = 25 [which is a square number]

Find other pairs of square numbers that makes Jasmine's trick work.

Unit 5 – Answers
Multiplication and division – factors and squares

For progression, children can be guided as follows:

Support	Core
Set A Q1-Q3 → Set B Q1-Q4 Set A Q4 → Set B Q5 Set A Q6 → Set B Q7	Set B Q1-Q4 → Set C – Q1-Q3 Set B Q5 → Set C Q5 Set B Q6 → Set C Q4
A Q8 → B Q10 → C Q10	

To help with the multiplication facts, make available a 10 by 10 or 12 by 12 multiplication table. Give out lists of prime and square numbers. For this worksheet, we are more interested in the children using these facts to solve problems.

The following hints/tips can be given:

- A Q1/Q2 - encourage the use of a multiplication table.
- A Q3 – give children the value of the tens digit.
- A Q4 – encourage working backwards in the multiplication table.
- A Q6/Q7 – remind children what each definition is.
- B Q1/Q4 – encourage the use of the table.
- B Q5/Q6 – use the table in reverse to find ONE pair of factors – encourage 'double/ halving techniques ($3 \times 8 = 6 \times 4 = 24$).
- B Q8/Q9 – is about pattern spotting (spot the growing trend).
- C Q1/Q2 – trial and improvement can help (a guessing game).
- C Q3 – ask children why the **X** value has to be **5** and not 0, 1 or 6.
- C Q8/Q9 – is about pattern spotting (spot the growing trend).
- A Q8 / B Q10 / C Q10 – be prepared to suggest one of the numbers to make initial progress.

Whole class examples:

1.

    a. $\boxed{8}$ × 4 = 32   b.   7 × $\boxed{6}$ = 42

    c.   24 ÷ $\boxed{3}$ = 8   d.   45 ÷ $\boxed{5}$ = 9

2.

a.	2 or 11 or 31		b.	25 or 100
c.	14		d.	2 or 25 or 100

3.

a.	17 = 1 + 16		b.	58 = 9 + 49
c.	74 = 25 + 49		d.	106 = 25 + 81

Unit 5 - Set A: Answers

1.

a. $\boxed{9}$ × 3 = 27

b. 6 × $\boxed{7}$ = 42

c. $\boxed{4}$ × 8 = 32

d. 9 ÷ $\boxed{2}$ = 18

e. 24 ÷ $\boxed{8}$ = 3

f. 27 ÷ $\boxed{3}$ = 9

g. 36 ÷ $\boxed{4}$ = 9

h. 48 ÷ $\boxed{8}$ = 6

2.

a. $\boxed{1}$ $\boxed{2}$ × $\boxed{3}$ = 36

b. $\boxed{3}$ $\boxed{1}$ × $\boxed{2}$ = 62

c. $\boxed{3}$ $\boxed{5}$ × $\boxed{2}$ = 70

d. $\boxed{4}$ $\boxed{5}$ × $\boxed{2}$ = 90

3.

a. $\boxed{2}$ $\boxed{4}$ ÷ $\boxed{3}$ = 8

b. $\boxed{3}$ $\boxed{5}$ ÷ $\boxed{7}$ = 5

c. $\boxed{4}$ $\boxed{8}$ ÷ $\boxed{6}$ = 8

d. $\boxed{2}$ $\boxed{7}$ ÷ $\boxed{3}$ = 9

4.

i.	1 × 10; 2 × 5.	ii.	**1 × 22; 2 × 11.**
iii.	1 × 12; 2 × 6; 3 × 4.	iv.	**1 × 30; 2 × 15; 3 × 10; 5 × 6.**
v.	*1 × 36; 2 × 18; 3 × 12; 4 × 9; 6 × 6. (6 appears twice)		

5.

a.	8, 16, 24, 32, 40, …	b.	9, 18, 27, 36, 45, …
c.	12, 24, 36, 48, 60 …		

6.

a.	3 or 13 or 29	b.	16 or 36 or 100
c.	39	d.	3

7.

a. 24

b. 49

c. 12 or 24

d. 19 or 29 or 41

8.

a. $\boxed{4}$ + $\boxed{9}$ = $\big(13\big)$

b. $\boxed{9}$ + $\boxed{16}$ = $\big(25\big)$

c. $\boxed{4}$ + $\boxed{25}$ = $\big(29\big)$

d. $\boxed{16}$ + $\boxed{36}$ = $\big(52\big)$

e. Possible answers could include:

1 + 16 = 17; 1 + 36 = 37; 1 + 81 = 82; 4 + 16 = 20; 4 + 36 = 40;

9 + 36 = 45; 9 + 81 = 90; … 16 + 16 = 32; 49 + 64 = 113…

Unit 5 - Set B: Answers

1.

a. $\boxed{1}\ \boxed{2}\ \times\ \boxed{3}\ = 36$ 　　　b. $\boxed{6}\ \boxed{5}\ \times\ \boxed{2}\ = 130$

2.

c. $\boxed{2}\ \boxed{4}\ \div\ \boxed{3}\ = 8$ 　　　d. $\boxed{3}\ \boxed{5}\ \div\ \boxed{7}\ = 5$

3.

a.
$$
\begin{array}{ccc}
\boxed{3} & 4 & \boxed{2} \\
\times & & 7 \\
\hline
2\quad 3 & 9 & 4
\end{array}
$$

b. $\boxed{3}\ \boxed{8}\ \times\ \boxed{8}\ \boxed{3}\ = 3154$

4.

a. $\boxed{3}\ \boxed{0}\ \times\ \boxed{7}\ = 210$

$\quad 3 \quad 5 \ \times\ 6 \ = 210$

$\quad 4 \quad 2 \ \times\ 5 \ = 210$

$\quad 7 \quad 0 \ \times\ 3 \ = 210$

b. $420 \div \boxed{5}\ =\ \boxed{8}\ \boxed{4}$

$\quad 420 \div 6 \ = \ 7 \quad 0$

$\quad 420 \div 7 \ = \ 6 \quad 0$

$\quad 420 \div 5 \ = \ 8 \quad 4$

5. a.

i.	26 = 1 x 26; 2 × 13	ii.	40 = 1 × 40; 2 × 20; 4 × 10; 5 × 8
iii.	60 = 1 × 60; 2 × 30; 3 × 20; 4 × 15; 5 × 12; 6 × 10	iv.	90 = 1 × 90; 2 × 45; 3 × 30; 5 × 18; 6 × 15; 9 × 10

b. Any square number: 16 = 1 x 16; 4 x 4. (3 factors: 1, 4 and 16)

64 = 1 x 64; 2 x 32; 4 x 16; 8 x 8. (7 factors: 1, 2, 4, 8, 16, 32 and 16)

6.

a. 12 = 2 × 2 × 3 　　　b. 20 = 2 × 2 × 5

c. 30 = 2 × 3 × 5 　　　d. 56 = 2 × 2 × 2 × 7

7.

a. 3 or 13 or 29

b. 16 or 36 or 100

c. 36

d. 3

e. $4 \times 25 \ (= 100)$

$4 \times 4 = 16$

$1 \times 36 = 36$

$1 \times 16 = 16$

$1 \times 100 = 100$

f. $36 + 64 \ (= 100)$

$4 + 25 = 29$

$4 + 9 = 13$

8.

$$1^3 = 1^2$$
$$1^3 + 2^3 = 3^2 \qquad (1 + 2 = 3)$$
$$1^3 + 2^3 + 3^3 = 6^2 \qquad (1 + 2 + 3 = 6)$$
$$1^3 + 2^3 + 3^3 + \qquad 4^3 = 10^2 \ (1 + 2 + 3 + 4 = 10)$$
$$1^3 + 2^3 + 3^3 + \qquad 4^3 + 5^3 = 15^2 \ (1 + 2 + 3 + 4 + 5 = 15)$$
$$1^3 + 2^3 + 3^3 + \qquad 4^3 + 5^3 + 6^3 = 21^2 \ (1 + 2 + 3 + 4 + 5 + 6 = 21)$$

9.

$$1 \qquad = 1 \ = 1^2$$
$$1 + 3 \qquad = 4 \ = 2^2$$
$$1 + 3 + 5 \qquad = \ 9 \ = \boxed{3}^2$$
$$1 + 3 + 5 + 7 \qquad \boxed{16} = \boxed{4}^2$$
$$1 + 3 + 5 + 7 + 9 \qquad \boxed{25} = \boxed{5}^2$$
$$1 + 3 + 5 + 7 + 9 + 11 \qquad \boxed{36} = \boxed{6}^2$$
$$1 + 3 + 5 + 7 + 9 + 11 + 13 \qquad \boxed{49} = \boxed{7}^2$$

10.

a. $\boxed{16} + \boxed{36} = \boxed{52}$

b. $\boxed{25} + \boxed{49} = \boxed{74}$

c. Here are a few: 1 + 16 = 17; 1 + 36 = 37; 1 + 81 = 82; 4 + 16 = 20; 4 + 36 = 40; 9 + 36 = 45; 9 + 81 = 90; ... 16 + 16 = 32; 49 + 64 = 113...

Unit 5 - Set C: Answers

1.

a. | 3 | 0 | × | 7 | = 210

3 5 × 6 = 210

4 2 × 5 = 210

7 0 × 3 = 210

b. 420 ÷ | 5 | = | 8 | 4 |

420 ÷ 6 = 7 0

420 ÷ 7 = 6 0

420 ÷ 5 = 8 4

2.

a. | 3 | 4 | 2 |

×   7

—————————————

2   3   9   4

b. | 3 | 8 | × | 8 | 3 |

= 3154

3.

Here is the order in which to solve the problem.

X = 5 because $5 \times 5 = 25$ (process of elimination x ≠ 0, 1 or 6).

N = 2 (it is not 7 as the product would be a 4-digit number).

P = 1 (all follow systematically)

S = 0

R = 6

Z = 3

```
        1    2    5
    ×        2    5
   ——————————————————
        6    2    5
   2    5    0    0
   ——————————————————
   3    1    2    5
   ——————————————————
```

4.

a. $20 = 2 \times 2 \times 5$

c. $90 = 2 \times 3 \times 3 \times 5$

b. $50 = 2 \times 5 \times 5$

d. $126 = 2 \times 3 \times 3 \times 7$

5.

a. 16 or 36 or 100

c. 16

e. 36 + 64 = 100

4 + 25 = 29

4 + 9 = 13

b. 36

d. $4 \times 25 = 100$

4 x 4 = 16

1 x 36 = 36

f. 100 – 36 = 64 (8 squared)

6.

a. $130 = 49 + 81$

c. $585 = 144 + 441$

b. $160 = 16 + 144$

d. $680 = 196 + 484$

or

$676 + 4$

7.

Multiples of 4: 376, 380, 384, 388, **392**, 396, 400, 404, …
Multiples of 7: 399, **392**, 385, 378, 371, 378, 385, 392, 399, 406
392 is the joint multiple of 4 and 7.

8.

$1^3 = 1^2$

$1^3 + 2^3 = 3^2$ $\quad\quad\quad\quad\quad\quad$ $(1 + 2 = 3)$

$1^3 + 2^3 + 3^3 = 6^2$ $\quad\quad\quad\quad$ $(1 + 2 + 3 = 6)$

$1^3 + 2^3 + 3^3 + 4^3 = 10^2$ $\quad\quad$ **$(1 + 2 + 3 + 4 = 10)$**

$1^3 + 2^3 + 3^3 + 4^3 + 5^3 = 15^2$ $\quad$ **$(1 + 2 + 3 + 4 + 5 = 15)$**

$1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 = 21^2$ $\quad$ **$(1 + 2 + 3 + 4 + 5 + 6 = 21)$**

9.

$1^3 = 1^2 = 1$

$2^3 = (1 + 2)^2 - 1^2 = 8$

$3^3 = (1 + 2 + 3)^2 - (1 + 2)^2 = 27$

$4^3 = (1 + 2 + 3 + 4)^2 (1 + 2 +...)^2 = 64$

$5^3 = (1 + 2 + 3 + 4 + 5)^2 - (1 + 2 + 3 + 4)^2 = 125$

$6^3 = (1 + 2 + 3 + 4 + 5 + 6)^2 - (1 + 2 + 3 + 4 + 5)^2 = 216$

10.

$9 + 16 = 25$ $\quad$ $(3^2 + 4^2 = 5^2)$	$36 + 64 = 100$ $\quad$ **$(6^2 + 8^2 = 10^2)$**
$25 + 144 = 169$ $\quad$ $(5^2 + 12^2 = 13^2)$	$100 + 576 = 676$ $\quad$ **$(10^2 + 24^2 = 26^2)$**
$49 + 576 = 625$ $\quad$ $(7^2 + 24^2 = 25^2)$	$196 + 2304 = 2500$ $\quad$ **$(14^2 + 48^2 = 50^2)$**
$81 + 1600 = 1681$ $\quad$ **$(9^2 + 40^2 = 41^2)$**	
$400 + 441 = 841$ $\quad$ **$(20^2 + 21^2 = 29^2)$**	

Unit 6 –
Multiplication and division operations

In this unit, you will:

- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers

- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

- multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000

- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.

B	O	D	M	A	S
Brackets (work these out first)	Orders (work out the powers)	Divide	Multiply	Add	Subtract

Whole class examples:

1. Work out the following: [S]

a.
$$
\begin{array}{r}
2\ \ 7 \\
\times\ \ 4 \\
\hline
\end{array}
$$

b.
$$
6\ |\ \overline{2\ \ 4\ \ 6}
$$

2. Perform the following calculations: [C]

a. 7×100 =

b. 23×10 =

c. $450 \div 10$ =

d. $4 \times 3 + 2$ =

3. Work out the following: [S]

a.
```
      5   6
 ×    3   4
 _____

 _____


 _____
```

b.
```
     _____

 7 | 1  7  7  1
```

4. Perform the following calculations: [C]

a. 7.2×100

b. $840 \div 100$

c. $12 - 18 \div 6$

d. $2 + 5 \times 4$

5. Insert any of the following symbols: +, -, × and ÷ to make the sums below work: [E]

a. 2 ☐ 3 ☐ 4 = 14

b. 8 ☐ 4 ☐ 2 ☐ 3 = 8

Unit 6 - Set A:

1. Work out the following: [S]

   a.   5   2

           ×   4

   b.   2   9

           ×   5

   c.   4 | 8   0   4

   d.   6 | 7   3   2

2. Perform the following calculations:

   a. 8×1000

   b. 4×100

   c. 24×100

   d. 361×10

   e. $200 \div 10$

   f. $620 \div 10$

   g. $35,000 \div 100$

   h. $94,000 \div 1000$

3. Complete these calculations:

   a. $25 \times 10 = $

   b. $\boxed{} \times 100 = 2500$

   c. $250 \times \boxed{} = 2500$

   d. $250 \div 10 = $

   e. $2500 \div \boxed{} = 250$

   f. $\boxed{} \div 1000 = 25$

4. The sum 2 + 3 × 4 = 14 and not 20 because we multiply the 3 and 4 before we add the 2 to the answer. Remember BODMAS … 2 + <u>3 × 4</u> = 2 + <u>12</u> = 14 …

Connect the following calculations to the correct answer. The first one is done for you.

a.	8 + 6 ÷ 2	21
b.	3 + 4 × 3	11
c.	6 × 3 + 3	3
d.	12 – 6 ÷ 2	15
e.	11 – 2 × 4	19
f.	4 + 5 × 3	9

Unit 6 - Set B

1. Work out the following: [S]

    a.
    ```
        4   9
    ×   3   2
    ```

    b.
    ```
        5   0
    ×   7   8
    ```

    c.
    ```
    6 | 7   4   4
    ```

    d.
    ```
    8 | 1   5   3   6
    ```

2. Perform the following calculations:

    a. 8.2×10

    b. 4.35×100

    c. 2.4×100

    d. 3.61×10

    e. $210 \div 10$

    f. $625 \div 10$

3. Fill in the gaps to complete the following sums:

    a. ☐ ÷ ☐ = 5

    b. ☐ ÷ ☐ = 9

    c. ☐ ÷ ☐ = 20

    d. ☐ ÷ ☐ = 50

4. Complete these calculations.

    a. 2.5   ×   10   =   [   ]

    b. [   ]   ×   100   =   250

    c. 0.25   ×   [   ]   =   250

    d. 25   ÷   10   =   [   ]

    e. 2500   ÷   [   ]   =   2.5

    f. [   ]   ÷   1000   =   0.25

5. Here are four cards with numbers on.

    | 1 | 4 | 5 | 7 |

    Jimmy uses all four cards to make a sum with an answer of 34.

    His sum is… 75 – 41 = 34… He could use … 5 × 7 – 1 = 34 … or …4 × 7 + 5 + 1 = 34…

    Use at least three of the given cards to make the following answers:

    a. 52   [   ]   b. 78   [   ]

    c. 44   [   ]   d. 23   [   ]

    e. 28   [   ]   f. 29   [   ]

    g. 49   [   ]   h. 43   [   ]

    i. 79   [   ]

Unit 6 - Set C

1. Using the numbers 3, 4 and 5 fill in the missing numbers to make the largest possible answers.

   a. ☐ × ☐ + ☐ = ☐

   b. ☐☐ × ☐ = ☐

2. Perform the following calculations:

   a.
   ```
        4  9
   ×    3  2
   _____

   _____


   _____
   ```

   b.
   ```
   _____
   8 | 1  5  3  6
   ```

3. Using BODMAS, connect the following calculations to the correct answer:

a.	2.4×100		21
b.	$37 \div 10$		3
c.	3.61×1000		0.456
d.	$456 \div 1000$		3.7
e.	$4 \times 6 - 3 \times 7$		240
f.	$9 \div 3 + 6 \times 3$		3610

3. Fill in the missing number to make both sides equal.

   a. 42 ÷ ☐ = 43 - 37

   b. 0.6 × 10 = 24 ÷ ☐

   c. 0.4 × 5 = ☐ ÷ 8

   d. 35 ÷ ☐ = 55 ÷ ☐

6. Here are four cards with numbers on.

| 1 | 4 | 5 | 7 |

Jimmy uses all four cards to make a sum with an answer of 34.

His sum is... 75 – 41 = 34...
He also made this sum: $4 + (7 – 1) \times 5 = 34$

[BODMAS – brackets, multiply, then subtract]

… and … $5 \times 7 – 1 = 34$ … or …$4 \times 7 + 5 + 1 = 34$…

Use at least three of the given cards to make the following answers:

a.	23		b.	28	
c.	29		d.	49	
e.	43		f.	79	
g.	38		h.	2	
i.	64				

Unit 6 – Answers
Multiplication and division operations

For progression children, can be guided as follows:

Support	Core
Set A Q1/Q2 → Set B Q1/Q2	Set B Q1 → Set C Q2
Set A Q2 → Set B Q4	Set B Q4 → Set C Q3
Set A Q4 → Set B Q5	Set B Q5 → Set C Q5

Further hints/tips are offered below:

- Set A Q2/Q3 – reinforce the movement of the digits (decimal point) on a regular basis. The emphasis will be placed on the correct direction.
- Set A Q4 – to prompt the children, ask which part (operation) do we do first?
- Set B Q1-3 – can the children check their division sums by working backwards and using multiplication, e.g. if $347 \times 6 = 2082 \div 6 = 347...$ then $347 \times 6 = 2082...$?
- Set B Q4 – emphasise the correct direction for $\times / \div$ by powers of 10.
- Set B Q5 – encourage at least two signs being using under BODMAS. Using brackets develops the use of multiplication/ division facts.
- Set C Q1 – just need to start with placing the 3 digits anywhere. Encourage children to set their own questions. Can they predict where to place them before they go onto to complete the calculation?
- Set C Q4 – get children working on both sides of the equality (sometimes together). Get children to write down 'part-answers' to help focus on the whole sum.
- Using brackets develops the use of multiplication/division facts. Can they make any of their own?

Whole class examples:

1.

a.
```
      2   7
  ×       4
  [1] [0] [8]
```

b.
```
         [4] [1]
  6 | 2̸ ²4  6
```

2.

a. 700

b. 230

c. 45

d. 14   (12 + 2 = 14)

3.

a.
```
           5   6
  ×        3   4
  ─────────────────
       2   2 ₂ 4
   1   6 ₁ 8   0
  [1   9 ₁ 0   4]
```

b.
```
             [2] [5] [3]
  7 | 1  ¹7  ³7  ²1
```

4.

a. 720

b. 8.4(0)

c. 9   (12 – 3 = 9)

d. 22   (2 + 20 = 22)

5.

a.
```
2 [+] 3 [×] 4 = 14
2 [+] 12  = 14
```

b.
```
8 [÷] 4 [+] 2 [×] 3 = 8
2 [+] 2 [×] 3 = 8
2 [+] 6 = 8
```

Unit 6 - Set A: Answers

1.

a.
$$\begin{array}{r} 5\ 2 \\ \times\ \ \ 4 \\ \hline \boxed{2}\ \boxed{0}\ \boxed{8} \\ {\scriptstyle 2} \end{array}$$

b.
$$\begin{array}{r} 2\ 9 \\ \times\ \ \ 5 \\ \hline \boxed{1}\ \boxed{4}\ \boxed{5} \\ {\scriptstyle 1}\ \ {\scriptstyle 4} \end{array}$$

c.
$$\begin{array}{r} \boxed{2}\ \boxed{0}\ \boxed{2} \\ 4\ \overline{\smash{)}\ 8\ \ 0\ \ 4} \end{array}$$

d.
$$\begin{array}{r} \boxed{1}\ \boxed{2}\ \boxed{2} \\ 6\ \overline{\smash{)}\ 7\ \ {}^{1}3\ \ {}^{1}2} \end{array}$$

2.

a.	8000	b.	400
c.	2400	d.	3610
e.	20	f.	62
g.	350	h.	94

3.

a. $25 \times 10 = \boxed{250}$

b. $\boxed{25} \times 100 = 2500$

c. $250 \times \boxed{10} = 2500$

d. $250 \div 10 = \boxed{25}$

e. $2500 \div \boxed{10} = 250$

f. $\boxed{25000} \div 1000 = 25$

4.

a.	$8 + 6 \div 2$		21
b.	$3 + 4 \times 3$		11
c.	$6 \times 3 + 3$		3
d.	$12 - 6 \div 2$		15
e.	$11 - 2 \times 4$		19
f.	$4 + 5 \times 3$		9

Unit 6 - Set B: Answers

1.

a.

```
        4   9
    ×   3   2
    ─────────────
        9 ₁ 8
    1   6 ₁ 8   0
    ─────────────
    1   5 ₁ 6   8
```

b.

```
        5   0
    ×   7   8
    ─────────────
    4   0   0
    5   0   0
    ─────────────
    3   9   0   0
```

c.

```
          1   2   4
    ─────────────────
    6    7  ¹4  ²4
```

d.

```
            1   9   2
    ─────────────────────
    8    1  ¹5  ⁷3  ¹6
```

2.

a.	82	**b.**	435
c.	240	**d.**	36.1
e.	21	**f.**	6.25

3.

a. $\boxed{10} \div \boxed{2} = 5$

15 ÷ 3 = 5 ... etc.

b. $\boxed{18} \div \boxed{2} = 9$

27 ÷ 3 = 9 ... etc.

c. $\boxed{40} \div \boxed{2} = 20$

100 ÷ 5 = 20

d. $\boxed{100} \div \boxed{2} = 50$

500 ÷ 10 = 50 ...

4.

a.	2.5	×	10	=	$\boxed{25}$
b.	$\boxed{2.5}$	×	100	=	250
c.	0.25	×	$\boxed{1000}$	=	250
d.	25	÷	10	=	$\boxed{2.5}$
e.	2500	÷	$\boxed{1000}$	=	2.5
f.	$\boxed{250}$	÷	1000	=	0.25

5.

a.	52	52 = 47 + 5 (45 + 7) 52 = 57 - 4 - 1 52 = *(5 + 7 + 1) × 4*
b.	78	78 = 75 + 4 - 1 (74 + 5 - 1)
c.	44	44 = 45 - 1 (51 - 7) 44 = *5 × (7 + 1) + 4* 44 = *(5 + 7 - 1) × 4*
d.	23	23 = 4 × 7 - 5 23 = *4 × (5 - 1) + 7*
e.	28	28 = 4 × 7 × 1 28 = 4 × 5 + 7 + 1 28 = *(5 - 1) × 7*
f.	29	29 = 4 × 7 + 1 29 = *4 × (7 - 1) + 5*
g.	49	49 = 5 × 7 + 14 = *(5 + 7) × 4 + 1*
h.	43	43 = 47 + 1 - 5 43 = 4 × 7 + 15
i.	79	79 = 75 + 4 (74 + 5) 79 = 51 + 4 × 7		

Unit 6 - Set C: Answers

1.

a. $\boxed{5} \times \boxed{4} + \boxed{3} = \boxed{23}$

(others $5 \times 3 + 4 = 19$; $3 \times 4 + 5 = 17$)

b. $\boxed{4}\ \boxed{3} \times \boxed{5} = \boxed{215}$

(others $54 \times 3 = 162$; $53 \times 4 = 212...$)

2.

a.
```
        4   9
    ×   3   2
    ─────────
        9 ₁ 8
  1   4 ₂ 7   0
  ┌─────────────┐
  │ 1   5   6   8│
  └─────────────┘
        1
```

b.
```
              ┌─────────────┐
              │   1   9   2 │
              └─────────────┘
  8 │  1̸   ²5   ⁷3   ¹6
```

3.

a.	2.4×100		21
b.	$37 \div 10$		3
c.	3.61×1000		0.456
d.	$456 \div 1000$		3.7
e.	$4 \times 6 - 3 \times 7$		240
f.	$9 \div 3 + 6 \times 3$		3610

4.

a. $42 \div \boxed{7} = 43 - 37$

b. $0.6 \times 10 = 24 \div \boxed{4}$

c. $0.4 \times 5 = \boxed{16} \div 8$

d. $35 \div \boxed{7} = 55 \div \boxed{11}$

5.

i.	23	23 = 4 × 7 - 5 23 = 4 × (5 - 1) + 7	ii.	28	28 = 4 × 7 × 1 28 = 4 × 5 + 7 + 1 28 = (5 - 1) × 7
iii.	29	29 = 4 × 7 + 1 29 = 4 × (7 - 1) + 5	iv.	49	49 = 5 × 7 + 14 = (5 + 7) × 4 + 1
v.	43	43 = 47 + 1 - 5 43 = 4 × 7 + 15	vi.	79	79 = 75 + 4 (74 + 5) 79 = 51 + 4 × 7
vii.	38	45 × 1 - 7 = (5 + 1) × 7 - 4	viii.	2	2 = 5 - 4 + 1 2 = (7 + 4 - 1) ÷ 5
ix.	64	64 = 7 × (5 + 4) + 1			

Unit 7 -
Multiplication and division scaling

In this unit, you will:

- multiply and divide numbers mentally, drawing upon known facts

- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret

- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Whole class examples:

1. If **59 × 7 = 413**, find the answers to: [S]

   a. 413 ÷ 7 =

   b. 4130 ÷ 7 =

   c. 413 ÷ 59 =

2. One banana costs 17p. Hershel wants to buy three of them.

   a. How much will three bananas cost?

   b. How much change will Hershel get if he pays with a 50p coin and 20p coin?

3. Use the calculation **67 × 7 =** to answer the following:

   a. 469 ÷ 67 =

   b. Julianna has a £5 note. She wants to buy some permanent marker pens which cost 67p each.

   i. How many pens can she buy?

   ii. How much change will she get?

4. Roger paid 56p for seven pencils. The cost of each pencil was the same.
   Work out the cost of four pencils.

5. If 42 × 61 = 2562, find the values of: [E]

   a. 420 × 61 =

   b. 4.2 × 6.1 =

   c. 4.2 × 610 =

   d. 2562 ÷ 61 =

   e. 25.62 ÷ 4.2 =

Unit 7 - Set A

1. If 74 × 6 = 444, find the answers to:

   a. 444 ÷ 6 =

   b. 4440 ÷ 6 =

   c. 444 ÷ 74 =

   d. 7400 × 6 =

   e. 74 × 600 =

2. A group of three friends share 56 sweets equally between themselves.

   a. How many sweets will each receive?

   b. Are there any sweets left over?

3. An apple costs 16p.

   a. How much will it cost for four apples?

   b. Can you buy six apples with a £1 coin?

4. Ashleigh buys two books, each costing the same.
   She pays with a £10 note and gets £3 change.

   How much does **one** book cost?

5. There are 46 children in year 5.

   a. How many teams of six can be made?

   b. How many children will be leftover?

6. 28 children turned up for a football coaching session.

   a. How many teams of five can be made?

   b. How many children will be leftover?

7. 38 sweets are shared between seven children.

   a. How many whole sweets will they each get?

   b. How many children will be left over?

8. 39 eggs are to be put into egg boxes which hold six eggs.

   a. How many boxes are needed to do this?
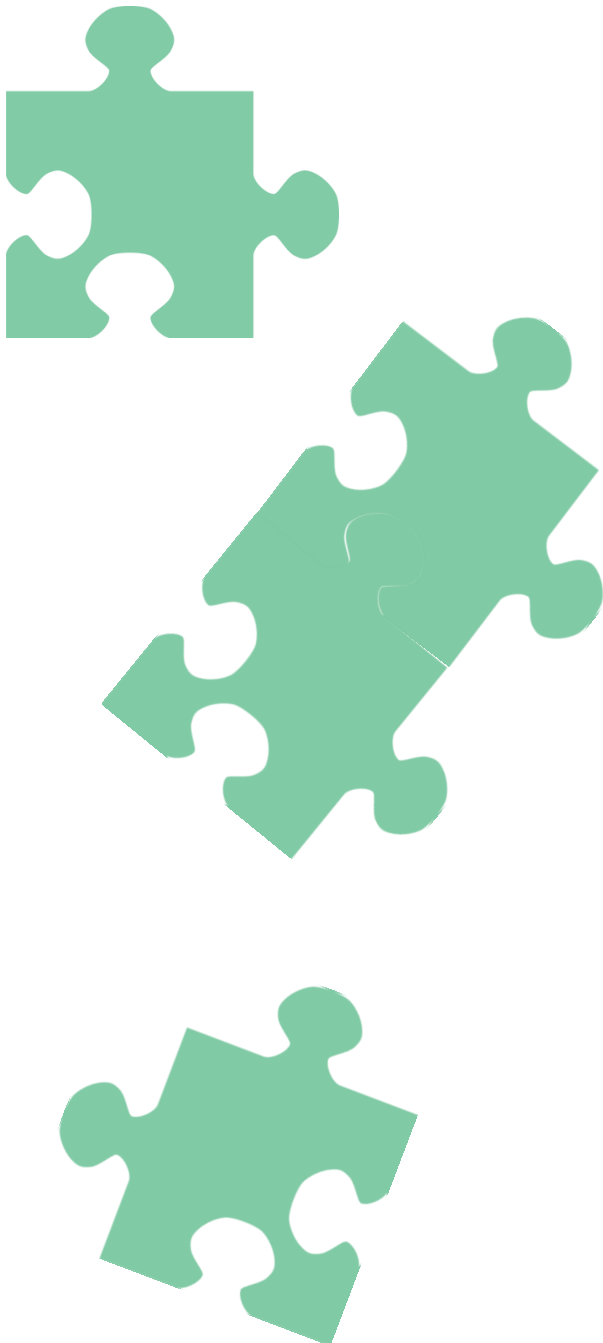
Unit 7 - Set B

1. If 89 × 7 = 623, find the answers to:

    a. 8900 × 7 =

    b. 8890 × 70 =

    c. 623 ÷ 7 =

    d. 6230 ÷ 89 =

    e. 662.3 ÷ 7 =

    f. 8.9 × 0.7 =

2. A £45 prize was shared equally between four boys.

    a. How much money did they each get?

    b. How much money would each boy get if they shared 45 £1 coins?

3. A box holds four cakes.

    a. How many boxes are needed for 21 cakes?

4. 58 children go into the hall for a concert.
   There are six seats in a row.

    a. How many rows are needed to seat everyone?

5. Use the calculation 37 × 24 = 888 to answer the following:

    a. 888 ÷ 37 =

    b. Jake wants to buy 24 lollies. They are 37p each. He pays with £9.

       i. How many lollies can he buy?

       ii. How much change does he receive?

6. Five cartons of juice cost 65p.

    a. How much would it cost for eight cartons?

7. James has 59 sweets. He divides the sweets between six people.

   a. How many does each person get?

   b. How many sweets are remaining?

8. I read 83 pages of my book over four days.

   a. Roughly, how many pages do I read a day?

   b. Why do I say roughly?

   c. What is the remainder?
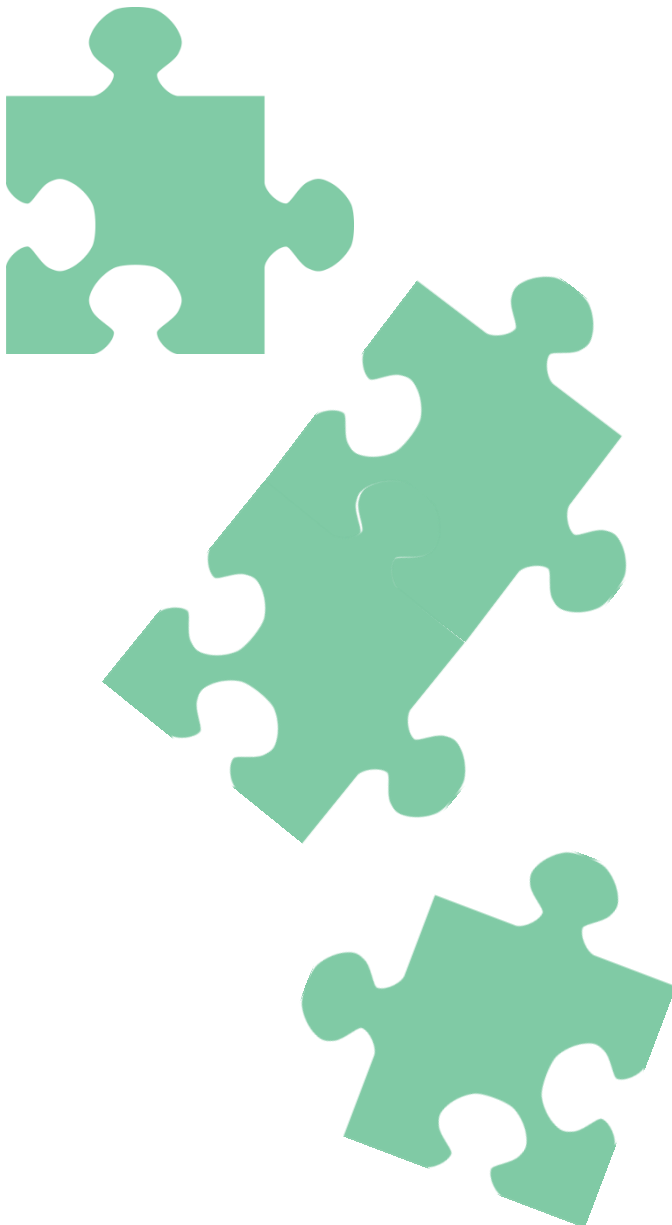
Unit 7 - Set C

1. If 8.9 × 7 = 62.3, find the answers to the following:

   a.   890 × 7 =

   b.   890 × 70 =

   c.   623 ÷ 7 =

   d.   6230 ÷ 8.9 =

   e.   62.3 ÷ 70 =

   f.   8.9 × 70 =

2. Five cartons of juice cost 65p.

   a.   How much would it cost for eight cartons?

3. Seven jigsaws cost £24.15.

   a.   Find the cost of four jigsaws.

4. A coach holds 50 passengers.

   a.   How many coaches are needed for 220 children?

   b.   How many spare seats will there be?

5. Lydia buys two books, each costing the same.
   She pays with a £10 note and gets £2.60 change.

   a.   How much does **one** book cost?

   b.   How much would **four books** cost?

6. Use the calculation 56 × 13 = 728 to answer the following:

   a.   728 ÷ 13 =

   b.   There are 750 children altogether in three local primary schools. They decide to share coaches when they travel to the annual sports games. If each coach can seat 56 pupils when full:

   i.   How many coaches do they need?

   ii.   How many spare seats would there be for extra spectators?

Unit 7 – Answers
Multiplication and division scaling

For progression, children can be guided as follows:

Support	Core
Set A Q1 $\rightarrow$ Set B Q1 Set A Q2-7 $\rightarrow$ Set B Q2/Q7	Set B Q1 $\rightarrow$ Set C Q1 Set B Q3/Q4 $\rightarrow$ Set C Q4 Set B Q5 $\rightarrow$ Set C Q6

The first question in each set relies on several skills. The main process is deciding whether the answer is going to be larger, so we are multiplying by 10, 100, etc. However, rounding and estimating can play a part. These set the foundations for further work in year 6 and beyond.

Further hints/tips are set out below:

- Set A Q1 – ask the children if the answer will be bigger or smaller. Remember the inverse operations [$\div$/ $\times$].
- Set A Q2-7 – if division is an issue, encourage the build-up method. We are not necessarily testing their division but are developing how they deal with the answers in their working.
- Set B Q1 – ask why they know that the answer will be bigger (multiplying by 10, 100, etc. …)
- Set B Q2-7 – the big emphasis is dealing with the result of the division. Encourage group discussion.
- Set C follows that of set B above.

Whole class examples:

1.

a.	59	b.	590
c.	7		

2.

a.	17p × 3 = **51p,** 50p + 20p = 70p
b.	Change = 70p – 51p = 19p

3.

a.	469 ÷ 67 = 7
b. i.	As 67 × 7 = 469, seven pens cost £4.69. By adding another 67p we would get £5.36 (too much), so £5 will buy seven marker pens
ii.	Change = 500 – 469 = 31p

4.

If 7 cost 56p , then 1 costs 56p ÷ 7 = 8p
So, 4 cost 4 × 8p = 32p

6.

a.	= 25,620	[multiplying 42 by 10 to get 420]
b.	= 25.62	[both numbers have been divided by 10]
c.	= 2562	[42 ÷ 10 = 4.2, 61 × 10 … cancel each other out]
d.	= 42	[inverse operation to original multiplication]
e.	= 6.1	[as 2562 ÷ 42 = 61; 2562 ÷ 100 = 25.62, 42 ÷ 10 = 4.2…] [roughly speaking 24 ÷ 4 = 6; so, the answer has to be close to 6]

Unit 7 - Set A: Answers

1.

a.	= 74 [inverse operation to original multiplication]
b.	= 740 [10 times as big as (a)]
c.	= 6 [inverse operation to original multiplication]
d.	= 44,400 [100 times as big; $74 \times 100 = 7400$]
e.	= 44,400 [100 times as big; $6 \times 100 = 600$]

2.

a.	$56 \div 3 = 18$ r2 [3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, **54**, 57…]. **18 sweets each**
b.	There are two sweets left over

3.

a.	$4 \times 16p = 64p$
b.	$6 \times 16p = 96p$. As £1 = 100p, yes you can (with 4p change)

4.

Books cost £10 - £3 = £7. Each book costs £7 ÷ 2 = £3.50

5.

a.	$46 \div 6 = 7$ r4 [6, 12, 18, 24, 30, 36, **42**, 48, …]
b.	Seven teams (of six) with **four** children left over

6.

a.	$28 \div 5 = 5$ r3 [5, 10, 15, 20, **25**, 30 …]
b.	**Five** teams (of five) with **three** children left over

7.

a.	$38 \div 7 = 5$ r3 [7, 14, 21, 28, **35**, 42 …]
b.	**Five** teams (of seven) with **three** children left over

8.

a.	$39 \div 6 = 6$ r3 [6, 12, 18, 24, 30, 36, **42,** 48, …] **Seven boxes** (of six) [we always need that extra **one**!]

Unit 7 - Set B: Answers

1.

a.	= 62300	[multiplying 89 by 100 to get 8900]
b.	= 62300	[multiplying 89 by 10, multiplying 7 by 10 to get 70]
c.	= 89	[inverse operation to original multiplication]
d.	= 70	[10 times a big as (a)]
e.	= 8.9	[62.3 = 623 ÷ 10, 10 times less]
f.	= 6.23	[as 8.9 = 89 ÷ 10; 0.7 = 7 ÷ 10, so divided by 100]

2.

a.	£45 ÷ 4 = 11 r1 = **£11.25**
b.	They get £11 each with £1 left over

3.

21 ÷ 4 = 5 r1   **Six** boxes are needed

4.

58 × 6 = 9 r4   **Ten** rows are required (two spare seats left)

5.

a.	888 ÷ 37 = 24
b. i.	As 37 × 24 = 888, then 24 lollies cost £8.88. By adding another 37p we would get £9.25 (too much), so £9 will buy **24 lollies.**
ii.	Change = 900 – 888 = **12p**

6.

a.	If five cost 65p , …. then one costs 65p ÷ 5 = 13p. So eight cost 8 × 13p = 104p = £1.04

7.

a.	59 ÷ 6 = 9 r5
b.	They get **nine sweets** each with **five** left over

8.

a.	83 ÷ 4 = 20 r3 **20 pages** each day (with **3** remaining)
b.	Roughly as they may read more on one day. Rounding: 80 ÷ 4 = 20; roughly 20 pages **or** Children may also suggest 21 pages each day, which is 84, as they could read less on one day
c.	There are **three** remaining

Unit 7 - Set C: Answers

1.

a.	= **6230**	[8.9 × 100 = 890]
b.	= **62300**	[both multiplied by 10]
c.	= **89**	[623 = 62.3 × 10]
d.	= **700**	[6230 = 62.3 × 100]
e.	= **0.89**	[7 = 70 ÷ 10, divide by 10]
f.	= **623**	[62.3 × 10 = 623]

2.

If five cost 65p , …. then one costs 65p ÷ 5 = 13p.
So, eight cost 8 × 13p = **104p = £1.04**

3.

If 7 cost £24.15 , …. then one costs £24.15 ÷ 7 = £3.45.
So**, four** cost 4 × £3.45 = **£13.80**

4.

a.	= 4 r2 [50, 100, 150, 200, **250**, 300, ….]. **Five coaches** are needed
b.	5 × 50 = 250. 250 – 220 = **30 spare seats**

5.

a.	£10 - £2.60 = £7.40. Each book costs £7.40 ÷ 2 = **£3.70**
b.	**Four** books cost 4 × £3.70 = **£14.80**

6.

a.	728 ÷ 13 = 56
b. i.	As 56 × 13 = 728, then 13 coaches would take 728 pupils. We need the extra coach. **14 coaches** are required
ii.	728 + 56 = 14 × 56 = 784 784 – 750 = **34** spare seats **or** 750 – 728 = 22; 56 – 22 = **34**
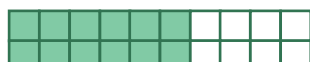
Unit 8 –
Fractions and decimal places

In this unit, you will:

- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with two decimal places to the nearest whole number and to one decimal place
- read, write, order and compare numbers with up to three decimal places
- solve problems involving number up to three decimal places.

Whole class examples:

1. Write down the **fraction** and decimal that is shaded below: [S]

   a.

   b.

   c.

   d.

   e.

   f.

2. Round the following decimals to the nearest whole number: [S]

   i.   7.2

   ii. 11.8

   iii. 87.3

   iv. 127

3. Write these in order of size starting with the smallest. [C]

    0.11   0.3   0.109   0.2   0.0999

4. Write the total as a decimal. [C]

    $$4 + \frac{2}{10} + \frac{7}{100} =$$

5. What number is halfway between zero point three and zero point four? [E]

6. Susan was 89.43 cm tall when she was 4 years old. By the time she was 16, Susan had grown a further 81.78 cm. How tall was she when she was 16? [E]

7. Paul cuts a ten-metre length of string into three lengths of 1.78 m, 2.07 m and 4.34 m. [E]

    a. How much of the string is left?

    b. Which length is the largest?

Unit 8 - Set A

1. Write down the **fraction** and **decimal** that is shaded below. [S]

a.

b.

c.

d.

e.

f.

2. Connect the estimated sum to the correct sum with a straight line.
   The first one is done for you.

Decimal number	Rounded number
7.48	10
6.9	7
12.5	15
19.27	13
20.3	19
15.36	20
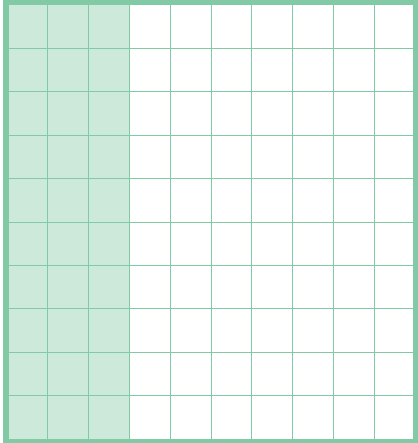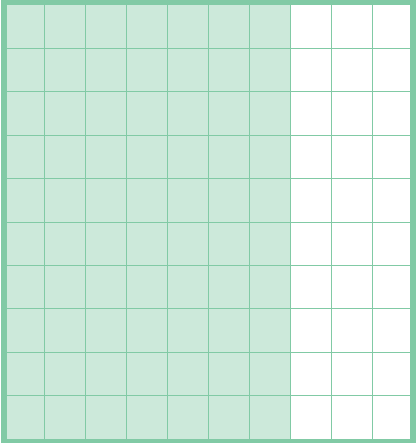
One of the rounded numbers (on the right-hand side) is not connected.
Write at least **three** decimal numbers that would round to this answer.

3. Insert the following symbols > (greater than) and < (less than) to make the following statements true:

a.	7.4		7.38
b.	15.34		15.4
c.	92.4		92.364
d.	0.84		0.9
e.	0.077		0.1

4. Jodie says, 'Adding 0.6 to 0.6 will give you a bigger number like 0.12.'
   Is Jodie right or wrong?

5. For each of the following 1 unit diagrams, write in the **decimal** and the **fraction**:

a.

b.

c.
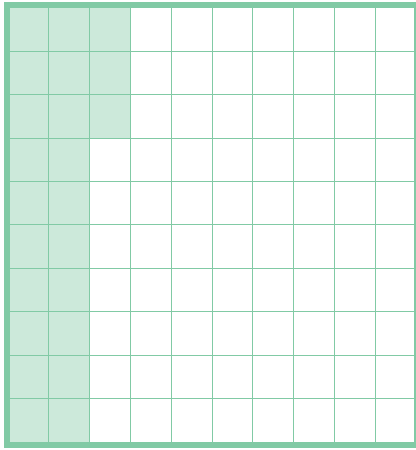
d.
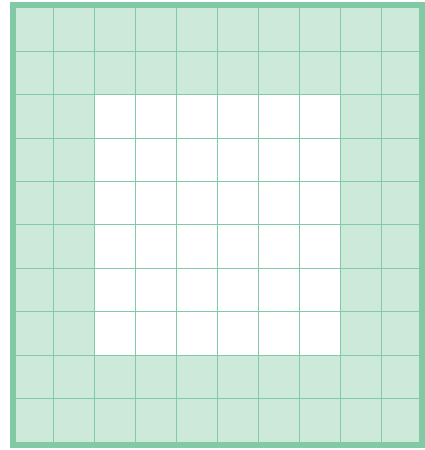
6. Shade in the following diagrams to represent the decimal above it.
   Write down the equivalent fraction below.

a.

0.43

b.

0.24

c.

| 0.9 |

d.

| 0.2 |

5. Albert runs 7.6 km on Monday, 9.3 km on Wednesday and 5.4 km on Friday.
   a. How far did he run altogether?

b. In a gymnastics competition, Gilly scored 9.4 on the beam, 11.7 on the floor, 8.7 on the bars and 10.0 on the vault.
   What is her total score?

c. Tracy is training in her local sweet shop. She has to weigh out packets of sweets holding 50 grams. Her first three packets weighed 57.23 g, 48.93 g and 52.45 g.
   What was the total weight of the three packets?

Unit 8 - Set B

1. Write down the **fraction** and decimal that is shaded below. [S]

   a.

   b.

   c.

2. Shade in the following diagrams to represent the decimal above it.
   Then, below the set of diagrams, order the decimals from the smallest to the largest.

   a.   0.23

   b.   0.08

c.

0.75

d.

0.6

Smallest | | | | | Largest

3. If $7 + \frac{3}{10} + \frac{1}{100} + \frac{8}{1000}$ = 7.318, write the following as decimals:

a. $3 + \frac{4}{10} + \frac{7}{100} + \frac{1}{1000}$

b. $12 + \frac{4}{10} + \frac{9}{100} + \frac{5}{1000}$

c. $9 + \frac{3}{10} + \frac{8}{1000}$

d. $7 + \frac{1}{100} + \frac{4}{1000}$

4. If 2.517 can be written as $2 + \frac{5}{10} + \frac{1}{100} + \frac{7}{1000}$, write the following the same way:

a. 5.416

b. 11.845

c. 4.407

d. 6.042

5. Insert the following symbols > (greater than) and < (less than) to make the following statements true:

a.	7.4	7.38
b.	15.34	15.4
c.	92.4	92.364
d.	0.84	0.9
e.	0.077	0.1
f.	4.51	$4 + {}^4/_{10} + {}^9/_{100}$
g.	0.54	${}^6/_{10}$
h.	0.08	${}^1/_{10}$
i.	0.3	${}^{27}/_{100}$
j.	7.2	$7 + {}^6/_{100}$

6. Circle the two fractions that are equivalent to 0.4.

$${}^4/_{10} \qquad {}^1/_{40} \qquad {}^{40}/_{100} \qquad {}^1/_4$$

7. Look at the following travel table:

		Wylam	Hexham	Durham
Adult	Single	£12.50	£15.60	£10.25
	Return	£23.75	£28.50	£19.30
Child	Single	£8.50	£10.80	£8.25
	Return	£14.90	£17.90	£14.75

a. What is the total cost for a return journey to Wylam for one adult and two children?

b. What is the total cost for a return to Hexham and a single to Durham for two adults?

8. What number is halfway between zero point eight and zero point nine?

9. Circle all the numbers that are greater than 0.4.

<div align="center">0.3   0.6   0.23   0.08   0.45</div>

10. Tsuzi had £60 to spend. She spent £25.97 on a pair of trainers and bought a new pair of jeans for £32.50.
How much money does she have left?
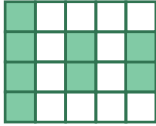
11. Link the following equivalent sums. The first one has been done for you.

Decimal number	Rounded number
$3/10 + 0.75$	$3/4$
$0.2 + 0.09$	1.05
$4 - 1.56 - 2.44$	1
3.083 rounded to one decimal place	0
$1.1 - 1/10$	$29/100$
$2 - 1.25$	3.1

Unit 8 - Set C

1. Write down the **fraction** and decimal that is shaded below. [S]

   a.

   b.

   c.

2. Shade in the following to represent the fraction. Write down the equivalent decimal.

   a. $\frac{1}{10}$

   b. $\frac{2}{5}$

   c. $\frac{3}{10}$

3. Insert the following symbols > (greater than) and < (less than) to make the following statements true.

   a. 0.35

   b. 0.9

   c. 0.35

   d. 4.51 $4 + \frac{4}{10} + \frac{9}{100}$

   e. 0.54 $\frac{6}{10}$

   f. 0.08 $\frac{1}{10}$

4. Link the following equivalent sums. The first one has been done for you.

Decimal number	Rounded number
$3/10 + 0.75$	$3/4$
$0.2 + 0.09$	1.05
$4 – 1.56 – 2.44$	1
3.083 rounded to one decimal place	0
$1.1 - 1/10$	$29/100$
$2 - 1.25$	3.1

5. Using the following list of numbers:

    0.009   0.1   0.7   0.9   0.09   0.007   0.07

    a. Write down two numbers that add up to 0.16.

    b. Write down three numbers whose sum is closest to 1.

6. What number is halfway between the following pairs of numbers?

    a. zero point four and zero point five.

    b. one point eight and two point six

7. Look at the following travel table:

		Wylam	Hexham	Durham
Adult	**Single**	£12.50	£15.60	£10.25
	Return	£23.75	£28.50	£19.30
Child	**Single**	£8.50	£10.80	£8.25
	Return	£14.90	£17.90	£14.75
Family*	**Return**	£63	£72	£60

*for up to 2 adults and 3 children

a. What is the total cost for a return journey to Wylam for one adult and two children?

b. What would be the saving if a family ticket was chosen by a family of two adults and two children travelling to and from Durham?

c. What would be the total cost for a return to Hexham and a single to Durham for two adults?

8. Mr Allen is 183.7 cm tall and his daughter Sharon is 147.9 cm tall. What is the difference in their heights?

9. A shopkeeper has 10 kg of potatoes to share out equally into four boxes.
   a. How much should each portion of potatoes weigh in kilograms?

In fact, he weighs out each portion as 2.71 kg, 2.49 kg, 1.98 kg and 2.43 kg.

b. How much does he actually weigh out in total?

c. What weight of potatoes is left?

10. A relay team of four are completing a charity marathon. The total distance of the run is 26 miles. Joey starts off by running 7.756 miles. His next two friends both run 5.85 miles each.

How far does the fourth friend have to run to complete the run?

Who ran the furthest?

Unit 8 – Answers
Fractions and decimal places

For progression, children can be guided as follows:

Support	Core
Set A Q1 → Set B Q1/Q2 Set A Q3 → Set B Q5 Set A Q7 → Set B Q7/Q10	Set B Q1/Q2 → Set CQ1/Q2 Set B Q5 → Set C Q3 Set B Q11 → Set C Q4 Set B Q10 → Set C Q9/Q10

Children can practice rounding to any decimal place once they have got the method in their mind. Questions such as Set B Q11 and Set C Q4 are encouraging the understanding of the equality of two quantities.

The worded questions Set A Q7, Set B Q10 and Set C Q7-Q10, encourage the pupils to write down their intermediate working.

Further help/tips are listed below:

- Set A Q2 the use of a number line can help
- Set A Q3 encourage extra zeros to help compare e.g. 7.3 → 7.30
- Set A Q4/Q7 requires column addition (practice makes perfect)
- Set A Q5/Q6 working towards 'out of 10 → out of 100/ %)
- Set B: follow similar tips as for Set A (column addition, equalities and working)
- Set C Q7-Q10 requires the children to carefully set out their working (any methods that work will suffice)

Whole class examples:

1.

a.	$\dfrac{3}{10} = 0.3$	b.	$\dfrac{4}{10} = \dfrac{2}{5} = 0.4$
c.	$\dfrac{8}{10} = \dfrac{4}{5} = 0.8$	d.	$\dfrac{8}{20} = \dfrac{4}{10} = \dfrac{2}{5} = 0.4$
e.	$\dfrac{12}{20} = \dfrac{6}{10} = \dfrac{3}{5} = 0.6$	f.	$\dfrac{6}{30} = \dfrac{2}{10} = \dfrac{1}{5} = 0.2$

2.

a.	7.2	$7.2 \approx$ **7**	b.	11.8	$11.8 \approx$ **12**
c.	87.3	$87.3 \approx$ **87**	d.	127	$127.5 \approx$ **128**

3.

Smallest: 0.0999   0.109   0.11   0.2   0.3   **Largest**

4.

$4 + \dfrac{2}{10} + \dfrac{7}{100} =$ **4.27**

5.

0.35

6.

```
      8   9  .  4   3
  +   8   1  .  7   8
  1   7   1  .  2   1
          1  1     1
```

7.

a.	1.81m left	b.	Largest = 4.34m

```
      1  .  7   8
  +   2  .  0   7
      4  .  3   4
      8  .  1   9
        1     1
```

```
            9    9   10
  +    1    0  .  0    0
       8       .  1    9
       1       .  8    1
```

Unit 8 - Set A: Answers

1.

a. $\dfrac{8}{10} = \dfrac{4}{5} = 0.8$	b. $\dfrac{9}{10} = 0.9$
c. $\dfrac{5}{10} = \dfrac{1}{2} = 0.5$	d. $\dfrac{2}{20} = \dfrac{1}{10} = 0.1$
e. $\dfrac{6}{20} = \dfrac{3}{10} = 0.3$	f. $\dfrac{12}{30} = \dfrac{4}{10} = \dfrac{2}{5} = 0.4$

2.

Decimal number		Rounded number
7.48		10
6.9		7
12.5		15
19.27		13
20.3		19
15.36		20

The remaining decimal is **10**. Any decimal between **9.5** and **10.49.**

3.

a.	7.4	>	7.38
b.	15.34	<	15.4
c.	92.4	>	92.364
d.	0.84	<	0.9
e.	0.077	<	0.1

4.

0.6 + 0.6 = **1.2** not 0.12 so she is wrong.

5.

a.	$0.3 = \frac{30}{100} = \frac{3}{10}$
c.	$0.23 = \frac{23}{100}$

b.	$0.7 = \frac{70}{100} = \frac{7}{10}$
d.	$0.64 = \frac{64}{100} = \frac{16}{25}$

6.

a.	Shade 43 squares = $\frac{43}{100}$
c.	Shade 90 squares = $\frac{90}{100} = \frac{9}{10}$

b.	Shade 24 squares = $\frac{24}{100} = \frac{6}{25}$
d.	Shade 20 squares = $\frac{20}{100} = \frac{1}{5}$

7. Albert runs 7.6 km on Monday, 9.3 km on Wednesday and 5.4 km on Friday.

a
```
    7 . 6
    9 . 3
  + 5 . 4
  ───────
    2 2 . 3
    ₂   ₁
```
Total = 22.3 km

b
```
    9 . 4
  1 1 . 7
    8 . 7
+ 1 0 . 0
  ───────
  3 9 . 8
    ₁ ₁
```
Total = 39.8 km

c
```
  5 7 . 2 3
  4 8 . 9 3
+ 5 2 . 4 5
───────────
1 5 8 . 6 1
  ₁ ₁   ₁   ₁
```
Total = 158.61 g

Unit 8 - Set B: Answers

1.

a.	$\frac{2}{10} = 0.2$	b.	$\frac{1}{5} = 0.2$
c.	$\frac{3}{5} = 0.6$		

2.

a.	any 23 squares	b.	any **8** squares
c.	any 75 squares	d.	any 60 squares

Smallest | 0.08 | 0.23 | 0.6 | 0.75 | **Largest**

3.

a.	= 3.471	b.	= 12.495
c.	= 9.308	d.	= 7.014

4.

a.	$= 5 + {}^4/_{10} + {}^1/_{100} + {}^9/_{1000}$	b.	$= 11 + {}^8/_{10} + {}^4/_{100} + {}^5/_{1000}$
c.	$= 4 + {}^4/_{10} + {}^7/_{1000}$	d.	$= 6 + {}^4/_{100} + {}^2/_{1000}$

5.

a.	7.4	>	7.38
b.	15.34	<	15.4
c.	92.4	>	92.364
d.	0.84	<	0.9
e.	0.077	<	0.1
f.	4.51	>	$4 + {}^4/_{10} + {}^9/_{100}$
g.	0.54	<	${}^6/_{10}$
h.	0.08	<	${}^1/_{10}$
i.	0.3	>	${}^{27}/_{100}$
j.	7.2	>	$7 + {}^6/_{100}$

6.

$\boxed{^4/_{10}}$ $^1/_{40}$ $\boxed{^{40}/_{100}}$ $^1/_4$

7.

a.

Adult	2	3	.	7	5
Child	1	4	.	9	0
Child	1	4	.	9	0
	5	3	.	5	5
	$_1$	$_2$			

Total = £53.55

b.

Return	2	8	.	5	0
	2	8	.	5	0
Single	1	0	.	2	5
	1	0	.	2	5
	7	7	.	5	0
	$_1$	$_1$		$_1$	

Total = £77.50

8.

Halfway between 0.8 and 0.9 = 0.85

9.

0.3 $\boxed{0.6}$ 0.23   0.08 $\boxed{0.45}$

10.

Spent

2	5	.	9	7
3	2	.	5	0
5	8	.	4	7

Change

$_5$	$_9$		$_9$	$_{10}$
$\cancel{6}$	$\cancel{0}$	.	$\cancel{0}$	$\cancel{0}$
5	8	.	4	7
	1	.	5	3

Change = £1.53

11.

Decimal number		Rounded number
$^3/_{10} + 0.75$		$^3/_4$
0.2 + 0.09		1.05
4 – 1.56 – 2.44		1
3.083 rounded to one decimal place		0
1.1 - $^1/_{10}$		$^{29}/_{100}$
2 - 1.25		3.1
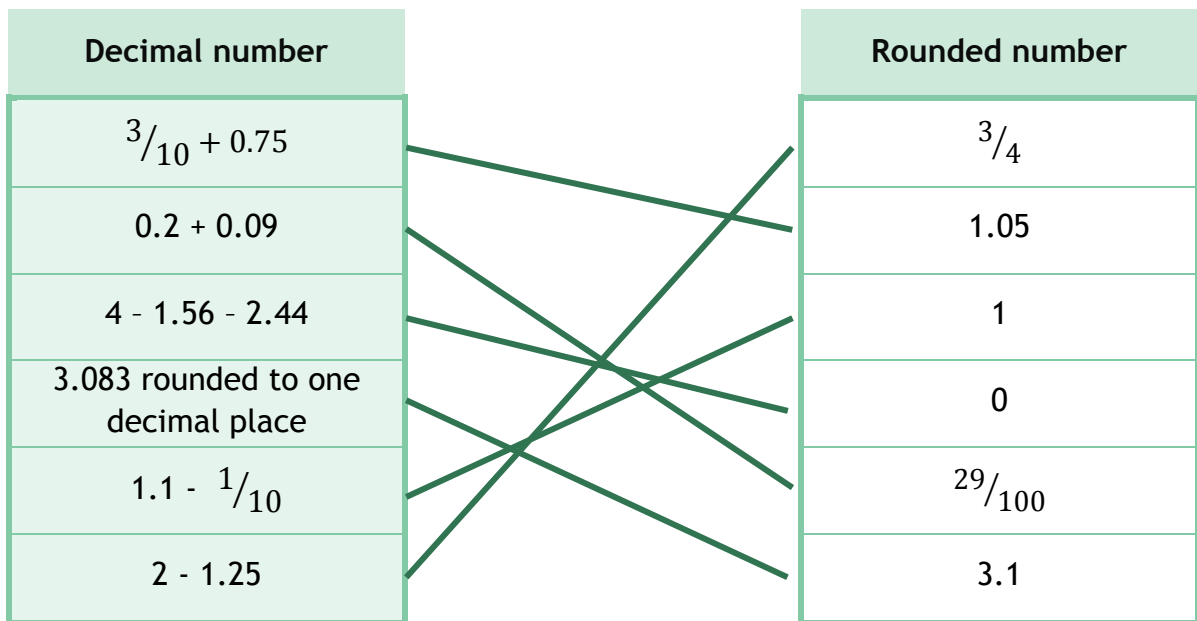
Unit 8 - Set C: Answers

1.

a.	$\frac{1}{5} = 0.2$
c.	$\frac{8}{20} = \frac{2}{5} = 0.4$

b.	$\frac{3}{5} = 0.6$

2.

a.	any **2** squares
c.	any **1½** squares

b.	any **4** squares

3.

a.	0.35	<	
b.	0.9	>	
c.	0.35	>	
d.	4.51	>	$4 + \frac{4}{10} + \frac{9}{100}$
e.	0.54	<	$\frac{6}{10}$
f.	0.08	<	$\frac{1}{10}$

4.

Decimal number	Rounded number
$\frac{3}{10} + 0.75$	$\frac{3}{4}$
$0.2 + 0.09$	1.05
$4 - 1.56 - 2.44$	1
3.083 rounded to one decimal place	0
$1.1 - \frac{1}{10}$	$\frac{29}{100}$
$2 - 1.25$	3.1

5.

a.	0.09 + 0.07 = **0.16** [Note: 0.7 + 0.9 = 1.6!]
b.	0.1 + 0.9 + 0.007 = 1.007; 0.9 + 0.09 + 0.007 = 0.997; 0.9 + 0.09 + 0.009 = 0.999... is the closest to 1.

6.

a.	0.45	b.	2.2

7.

a.

```
Adult       2  3  .  7  5
Child       1  4  .  9  0
Child   +   1  4  .  9  0
            ─────────────
            5  3  .  5  5
            1     2
```

Total = £53.55

b.

```
Adult       1  9  .  3  0
            1  9  .  3  0
Child   +   1  4  .  7  5
            1  4  .  7  5
            ─────────────
            6  8  .  1  0
            2     2     1
```

Saving = £68.10 - £60
              = £8.10

c.

```
Return      2  8  .  5  0
            2  8  .  5  0
            1  0  .  2  5
        +   1  0  .  2  5
            ─────────────
            7  7  .  5  0
            1     1     1
```

Total = £77.50

8.

a.

```
                    7   ¹2      1
Difference    1     8̸   3̸   .   7
          -   1     4   7   .   9
              ──────────────────
                    3   5   .   8
```

Difference = 35.8 cm

9. a.

One weighs £10 ÷ 4 = 2.5kg

b.

```
  2 . 7 1
  2 . 4 9
  1 . 9 8
  2 . 4 3
  9 . 6 1
  2     2
```

c.

Remainder

```
      9       9   1
  1   0 . 0   0
-   9 . 6   1
  0 . 3   9
```

Still needs **0.39 kg**

10.

```
  7 . 7 5 6
  5 . 8 5 0
  5 . 8 5 0
1 9 . 4 5 6
1   2     1
```

Remaining

```
  1   15      9   9   10
  2   6 . 0   0   0
-   1 9 . 4 5 6
    6 . 5 4 4
```

Fourth runs 6.544 miles

Joey runs the furthest

Unit 9 -
Fractions equivalence: fractions, decimals and percentages

🧩 In this unit, you will:

- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths

- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.

- add and subtract fractions with the same denominator and denominators that are multiples of the same number.

- recognise the per cent symbol (%) and understand that per cent is 'number of parts per 100' and write % as a fraction with denominator 100 and as decimals.

- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$, and those fractions with a denominator of a multiple of 10 or 25

Whole class examples:

1. Shade in the squares to represent the given fraction. [S]

   a. $^{7}/_{10}$

   b. $^{3}/_{4}$

   c. $^{2}/_{5}$

2. Complete the following calculations: [S]

a.	$\frac{3}{10} + \frac{4}{10}$	
b.	$\frac{4}{5} - \frac{1}{5}$	
c.	$\frac{1}{5}$ of £15	

3. Fill in the gaps to make each row equivalent. [C]

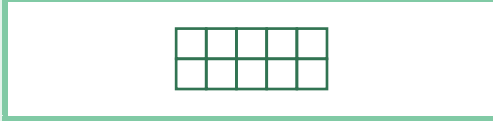|	Fraction	Decimal	Percentage
a.	$^1/_4$		
b.		0.2	
c.			50%
d.		0.8	
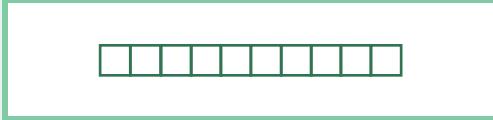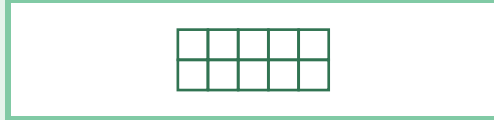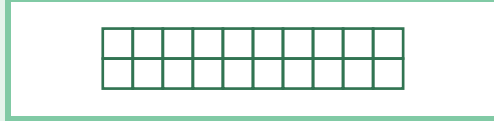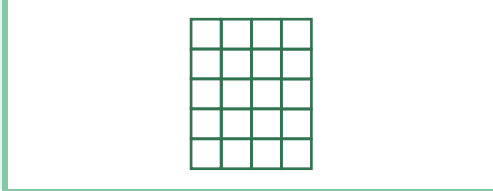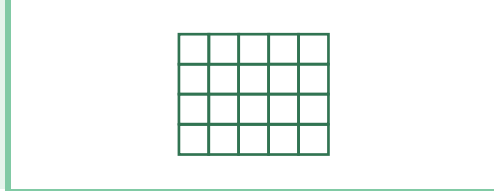
4. Insert the following symbols, > (greater than), < (less than) or = (equals): [E]

a.	7/2		$3\,^1/_2$
b.	70%		$^4/_5$
c.	0.85		$^3/_4$
d.	0.12		$^1/_2$
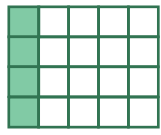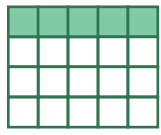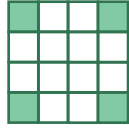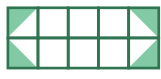
Unit 9 - Set A

1. Shade in the squares to represent the given fraction.

a. $^4/_{10}$

b. $^9/_{10}$

c. $^1/_5$

d. $^3/_{10}$

e. $^3/_4$

f. $^1/_4$
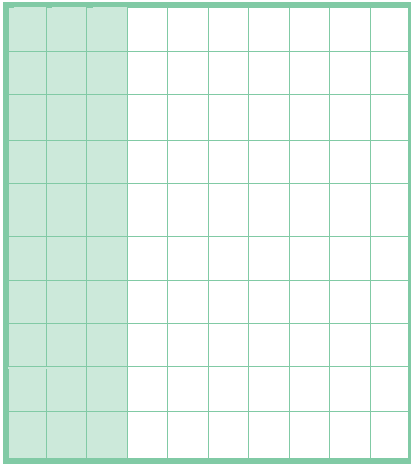
2. Tick each of the diagrams below which represent a quarter.

a.

b.

c.

d.

e.

f.
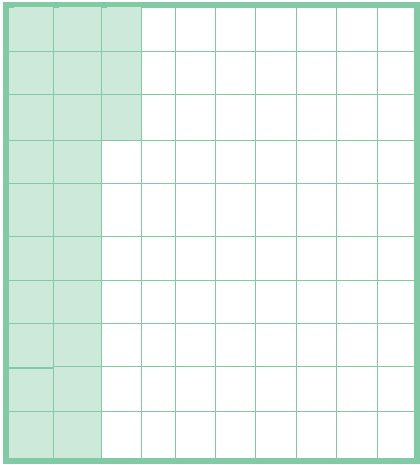
3. Write down the percentage shaded in and write down the equivalent fraction.

a.

[   ] = [/   ]
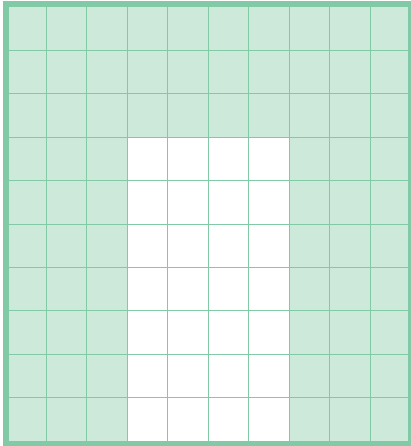
b.

[   ] = [/   ]
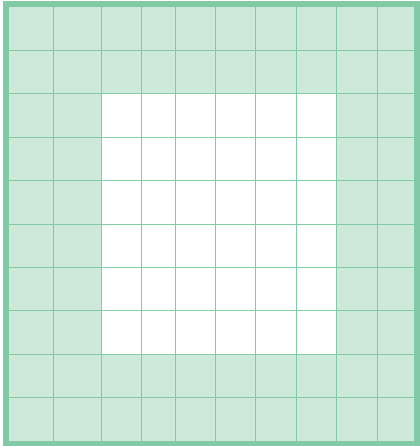
c.

[   ] = [/   ]

d.

[   ] = [/   ]

4. Shade in the squares to represent the given percentage.

a.

60 %

b.

25 %

c.

20 %

d.

30 %

5. Look at these percentages: 20 %, 25 %, 30 %, 35 %, 20 %, 20 %, 20 %
   a. Which percentage is equal to:

   i. $^1/_5$

   ii. $^1/_4$

   iii. $^1/_2$?

   b. Which of the percentages from the list is equal to two-fifths?

6. Steven has a bag that contains five blue marbles and three red marbles.

   a. What fraction of the marbles in the bag are blue?

   Steven adds one blue marble and one red marble to the bag.

   b. What fraction of the marbles in the bag are blue?

7. Complete the following addition and subtraction sums:

a. $\dfrac{1}{10} + \dfrac{4}{10}$ b. $\dfrac{1}{4} + \dfrac{1}{4}$

c. $\dfrac{3}{5} - \dfrac{1}{5}$ d. $\dfrac{7}{25} - \dfrac{4}{25}$

8. Work out these calculations. You may use the grid opposite.

a. $^1/_2$ of £12

b. $^1/_4$ of £12

c. $^3/_4$ of £12

Unit 9 - Set B

1. a. Write down what percentage the shading represents in each diagram below.

i.

iii.

v.

ii.

iv.

vi.

b Put a tick next to each diagram that represents a quarter.

2. Connect each statement with its equivalent answer or statement. The first one is done for you.

Decimal number		Rounded number
a. 50% of 8		30%
b.		3
c. $3/10$		$1/4$ of 16
d. $1/5$ of 15		$72/100$
e. 72%		$6/10$
f. $3/5$		0.5

3. Harry wants to change the mixed number $2\frac{3}{4}$ into an improper fraction. He chooses to use squares to illustrate this.

e.g.   1 whole   1 whole   3 out of 4   **11 squares** (2 × 4 + 3 = 11)

So $2\,^3/_4 = \mathbf{^{11}/_4}$

Use a similar method to change the following mixed numbers into improper fractions.

a. $2\,^1/_4$

b. $1\,^3/_4$

c. $4\,^1/_4$

d. $2\,^3/_5$

4. Ashleigh is trying to show her friend Jude how to do 'fractions of...' sums. The sum she is trying to build up to is, "What is $^3/_5$ of £20?"

She begins by shading in 1⁄5 of a 20-square grid. She fills in **four** squares. She says "1⁄5 of 20 = 4."
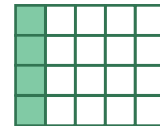
Jude continues shading in columns of four squares until three columns are done.
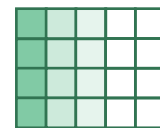
She then counts up all the squares and gets 12.

They both agree that 3⁄5 of £20 = £12.

Use a similar method to answer these calculations.

a. $^3/_4$ of £20

b. $^4/_5$ of £10

c. $^2/_5$ of £30

d. $^7/_{10}$ of £30

e. $^3/_4$ of £24

f. $^3/_{10}$ of £60

5. We can create equivalent fractions by simply building up fraction tables.

e.g. for $\dfrac{3}{8}$

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

$$\frac{3}{8} = \frac{6}{} = \frac{9}{} = \frac{12}{} = \frac{15}{} =$$

$$\frac{3}{8} = \frac{6}{16} = \frac{9}{24} = \frac{12}{32} = \frac{15}{42} = \ldots$$

Write down the next four numbers in the 3 times table. This completes the numerators (tops). We do the same for the denominators (bottoms) using the 8 times table.
This gives us a set of equivalent fractions.

Now look at this.

From the above fraction table, the missing number is 9.
Complete the following using fraction tables to help:

a. $\dfrac{3}{4} = \dfrac{\boxed{}}{12}$

b. $\dfrac{2}{3} = \dfrac{\boxed{}}{12}$

c. $\dfrac{5}{6} = \dfrac{\boxed{20}}{\boxed{}}$

d. $\dfrac{2}{5} = \dfrac{\boxed{10}}{\boxed{}}$

6. Complete the following addition and subtraction sums:

a. $\dfrac{1}{5} + \dfrac{4}{10}$

b. $\dfrac{1}{2} + \dfrac{1}{4}$

c. $\dfrac{4}{5} - \dfrac{3}{10}$

Unit 9 - Set C

1. Connect each statement with its equivalent answer or statement. The first one is done for you.

	Decimal number		Rounded number
a.	50% of 8		30%
b.	▨		3
c.	$^3/_{10}$		$^1/_4$ of 16
d.	$^1/_5$ of 15		$^{72}/_{100}$
e.	72%		$^6/_{10}$
f.	$^3/_5$		0.5
g.	$^3/_5 + ^1/_{10}$		3

2. A fraction table is made by setting up a number (counting) sequence for both the numerator and denominator.

e.g. $\dfrac{3}{8} = \dfrac{6}{16} = \dfrac{9}{24} = \dfrac{12}{32} = \dfrac{15}{40} = \ldots$ the numerator goes up in 3s; denominator up in 8s.

e.g. $\dfrac{5}{8} = \dfrac{1}{6}$

$\dfrac{5}{8} = \dfrac{10}{16} = \boxed{\dfrac{15}{24}} = \dfrac{20}{32} = \dfrac{25}{40}$

$\dfrac{1}{6} = \dfrac{2}{12} = \dfrac{3}{18} = \boxed{\dfrac{4}{24}} = \dfrac{5}{30}$

> Write down the first 5 tables for $\frac{5}{8}$
>
> Repeat for $\frac{1}{6}$.
>
> Circle the **first** fraction in both lists with the **same denominator**.
>
> Now **add** the numerators.

So $\dfrac{5}{8} + \dfrac{1}{6} = \dfrac{15}{24} + \dfrac{4}{24}$

$= \dfrac{19}{24}$

Unit 9 - Fractions equivalence: fractions, decimal and percentages

Complete the following addition and subtraction sums by building up fraction tables:

a. $\dfrac{1}{5} + \dfrac{4}{10}$

b. $\dfrac{3}{8} + \dfrac{5}{12}$

c. $\dfrac{1}{6} + \dfrac{4}{9}$

d. $\dfrac{5}{8} - \dfrac{1}{6}$

e. $\dfrac{5}{6} - \dfrac{1}{4}$

f. $\dfrac{4}{9} - \dfrac{5}{12}$

3. Complete the following using fraction tables to help:

a. $\dfrac{3}{4} = \dfrac{\square}{12}$

b. $\dfrac{2}{3} = \dfrac{\square}{12}$

c. $\dfrac{5}{6} = \dfrac{20}{\square}$

d. $\dfrac{2}{5} = \dfrac{10}{\square}$

4. Insert the following symbols, > (greater than), < (less than) or = (equals): [E]

a.	$7/2$	$3\,1/2$
b.	70%	$4/5$
c.	0.85	$3/4$
d.	0.12	$1/2$
e.	$1\,2/3$	$4/3$

5. Use the following numbers to make these equations correct:

18   15   7   12   20   6   12   5   19   4   3

a. $\dfrac{\square}{8} = \dfrac{\square}{40}$ b. $\dfrac{\square}{6} = \dfrac{\square}{24}$ c. $\dfrac{\square}{7} = \dfrac{\square}{21}$

6. There are 24 hours in a day and scientists tell us that we should sleep for $3/8$ of the day. How much time should we spend sleeping?

7. Mr Murphy is 160 cm tall and his brother Tim is $9/10$ as tall as him. How tall is Tim?

8. There are 25 pupils in the class, $2/5$ of the pupils support Liverpool and the remainder support Manchester United. How many support Manchester United?

9. John and Jean swim for a charity fundraiser. If John swam $^5/_9$ of a mile and Jean swam $^2/_3$ of a mile, who swam further?

How far did they swim altogether?

10. Andrea eats $\frac{1}{6}$ of a pizza. Later, she eats another $\frac{5}{12}$. How much of the pizza has she eaten?

Unit 9 - Answers

Fractions equivalence: fractions, decimals and percentages

For progression, children can be guided as follows:

Support	Core
Set A Q1/Q2 → Set B Q1 Set A Q7 → Set B Q6 Set A Q8 → Set B Q4	Set B Q2 → Set C Q1 Set B Q6 → Set C Q2 Set B Q5 → Set C Q5 Set B Q4 → Set C Q7/Q8

This unit covers quite a lot of the objectives. It may be beneficial to mix some of the sets to give sufficient coverage of the curriculum.

The idea of build-up is introduced here and works well for those who don't know their table facts but can add (count up). It especially works for: matching equivalent fractions, adding/subtracting fractions and finding a fraction of a thing – although any correct method will do.

e.g. Find $\frac{3}{8}$ of £32.

Fraction table: $\frac{3}{8} = \frac{6}{16} = \frac{9}{24} = \mathbf{\frac{12}{32}}$ ...

We stop here because the 'target' is £32 (denominator).

So $\frac{3}{8}$ of £32 = £12 (numerator).

Whole class examples:

1.

a.	Shade any 7 squares	b.		Shade any 6 squares
c.	Shade any 4 squares			

2.

a.	$\dfrac{7}{10}$	b.	$\dfrac{3}{5}$	c.	£3

3.

	Fraction	Decimal	Percentage
a.	$^1/_4$	0.25	25%
b.	$^1/_5$*	0.2	20%
c.	$^1/_2$*	0.5	50%
d.	$^4/_5$*	0.8	80%

* or equivalent fraction: $\dfrac{1}{5} = \dfrac{2}{10} = \dfrac{3}{15} = \dfrac{4}{20} = \dfrac{5}{25}$ ...

4.

a.	7/2	=	$3\,^1/_2$
b.	70%	<	$^4/_5$
c.	0.85	>	$^3/_4$
d.	0.12	<	$^1/_2$

Unit 9 - Set A: Answers

1.

a.	shade any **4** squares		b.	shade any **9** squares
c.	shade any **2** squares		d.	shade any **6** squares
e.	shade any **15** squares		f.	shade any **5** squares

2.

a.	$^4/_8 = {}^1/_2$	✕	b.	$^2/_8 = {}^1/_4$	✓
c.	$^4/_{20} = {}^1/_5$	✕	d.	$^5/_{20} = {}^1/_4$	✓
e.	$^4/_{16} = {}^1/_4$	✓	f.	$^2/_8 = {}^1/_4$	✓

3.

a.	30% = $\frac{30}{100}$ **or** $\frac{3}{10}$ *	b.	23% = $\frac{23}{100}$
c.	72% = $\frac{72}{100}$ **or** $\frac{36}{50}$ or $\frac{18}{25}$ *	d.	64% = $\frac{64}{100}$ **or** $\frac{32}{50}$ or $\frac{16}{25}$ *

4.

a.	60% = any **60** squares	b.	25% = any **25** squares
c.	20% = any **2** squares	d.	30% = any **1½** squares

a.

i.	$^1/_5$ = 20%	ii.	$^1/_4$ = 25%
iii.	$^1/_2$ = 50%		

b.

$^2/_5$ = 40%

5.

    a. Fraction blue is $^5/_8$

    c. Fraction blue is $^6/_{10}$ or $^3/_5$

6.

    a. $\dfrac{5}{10} + \dfrac{1}{2}$ b. $\dfrac{2}{4} + \dfrac{1}{2}$

    c. $\dfrac{2}{5}$ d. $\dfrac{3}{25}$

7.

    a. £6

    b. £3

    c. £9

Unit 9 - Set B: Answers

1.

a.

i.	50%	×	ii.	25%	✓	iii.	20%	×
iv.	25%	✓	v.	25%	✓	vi.	25%	✓

b.

i.	$^4/_8 = ^1/_2$	×	ii.	$^2/_8 = ^1/_4$	✓	iii.	$^4/_{20} = ^1/_5$	×
iv.	$^5/_{20} = ^1/_4$	✓	v.	$^4/_{16} = ^1/_4$	✓	vi.	$^2/_8 = ^1/_4$	✓

2.

	Decimal number		Rounded number
a.	50% of 8		30%
b.	▰▱▱▰		3
c.	$^3/_{10}$		$^1/_4$ of 16
d.	$^1/_5$ of 15		$^{72}/_{100}$
e.	72%		$^6/_{10}$
f.	$^3/_5$		0.5

3.

a.	$^9/_4$	b.	$^7/_4$
c.	$^{17}/_4$	d.	$^{13}/_5$

4.

a.	= £15	b.	= £8	c.	= £12
d.	= £21	e.	= £18	f.	= £18

5.

a. $\dfrac{3}{4} = \dfrac{\boxed{9}}{\boxed{12}}$ $\left[\dfrac{3}{4} = \dfrac{6}{8} = \dfrac{9}{12}\right]$

b. $\dfrac{2}{3} = \dfrac{\boxed{8}}{\boxed{12}}$ $\left[\dfrac{3}{4} = \dfrac{6}{8} = \dfrac{9}{12}\right]$

c. $\dfrac{5}{6} = \dfrac{\boxed{20}}{\boxed{24}}$ $\left[\dfrac{3}{4} = \dfrac{6}{8} = \dfrac{9}{12}\right]$

d. $\dfrac{2}{5} = \dfrac{\boxed{10}}{\boxed{25}}$ $\left[\dfrac{3}{4} = \dfrac{6}{8} = \dfrac{9}{12}\right]$

6.

a. $\dfrac{6}{10}$ or $\dfrac{3}{5}$

b. $\dfrac{3}{4}$

c. $\dfrac{5}{10}$ or $\dfrac{1}{2}$

Unit 9 - Set C: Answers

1.

	Decimal number		Rounded number
a.	50% of 8		30%
b.	▨☐☐☐		0.7
c.	$^3/_{10}$		$^1/_4$ of 16
d.	$^1/_5$ of 15		$^{72}/_{100}$
e.	72%		$^6/_{10}$
f.	$^3/_5$		0.5
g.	$^3/_5 + ^1/_{10}$		3

2.

a.	$\frac{6}{10}$ or $\frac{3}{5}$	b.	$\frac{19}{24}$	c.	$\frac{11}{18}$
d.	$\frac{11}{24}$	e.	$\frac{14}{24}$ or $\frac{7}{12}$	f.	$\frac{1}{36}$

3.

a. $\frac{3}{4} = \frac{\boxed{9}}{12}$ $\left[\frac{3}{4} = \frac{6}{8} = \frac{9}{12}\right]$

b. $\frac{2}{3} = \frac{\boxed{8}}{12}$ $\left[\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12}\right]$

c. $\frac{5}{6} = \frac{20}{\boxed{24}}$ $\left[\frac{5}{6} = \frac{10}{12} = \frac{15}{18} = \frac{20}{24}\right]$

d. $\frac{2}{5} = \frac{10}{\boxed{25}}$ $\left[\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{8}{20} = \frac{10}{25}\right]$

4.

a.	$^7/_2$	$=$	$3^1/_2$	b.	70%	$<$	$^4/_5$
c.	0.85	$>$	$^3/_4$	d.	0.12	$<$	$^1/_2$
e.	$1^2/_3$	$>$	$^4/_3$				

5.

a.	**3** and **15** or **4** and **20**	b.	**3** and **12** or **5** and **20**	c.	4 and **12** or **5** and **15** or **6** and **18**

6.

$^3/_8$ of 24 = 24 ÷ 8 × 3 = **9 hours**

7.

$^9/_{10}$ of 160 = 160 ÷ 10 × 9 = **144 cm**

8.

1 - $^2/_5$ = $^3/_5$, $^3/_5$ of 25 = 25 ÷ 5 × 3 = **15 pupils** like Manchester United

9.

Use fraction tables: e.g. John $\frac{5}{9} = \frac{10}{18} = \cdots$, Jean $\frac{2}{3} = \frac{4}{6} = \frac{6}{9} \cdots$, **Jean** swam further.

10.

Total $= \frac{5}{9} + \frac{6}{9} = \frac{11}{9}$ **miles,** $= 1\frac{2}{9}$ **miles**

11.

$\frac{1}{6} = \frac{2}{12} = \cdots$, total eaten $= \frac{2}{12} + \frac{5}{12} = \frac{7}{12}$ **pizza**