Year 5

Problem solving

- number

Contents

Unit 6- multiplication and division operations

Unit 7- multiplication and division - scaling

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Unit 9- fractions equivalence - fractions, decimals and percentages

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 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'

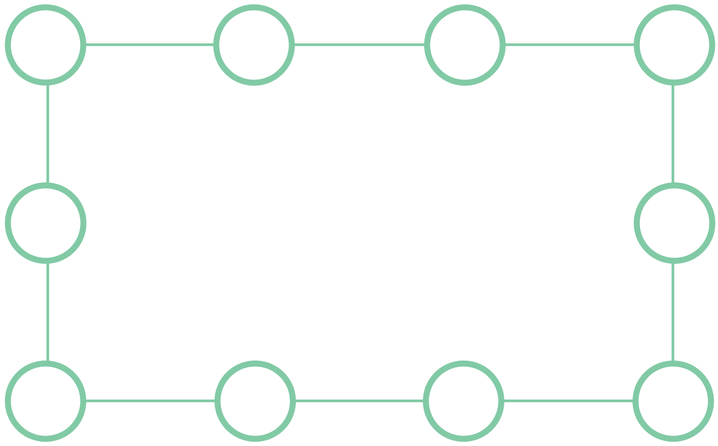
Example:

1. Fill in the gaps: [S]

a.	9 + ☐ = 30	b.	51 + ☐ = 100
c.	350 + ☐ = 1000	d.	60 - ☐ = 13
e.	☐ - 25 = 37	f.	☐ - 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

5. Fill in the gaps:

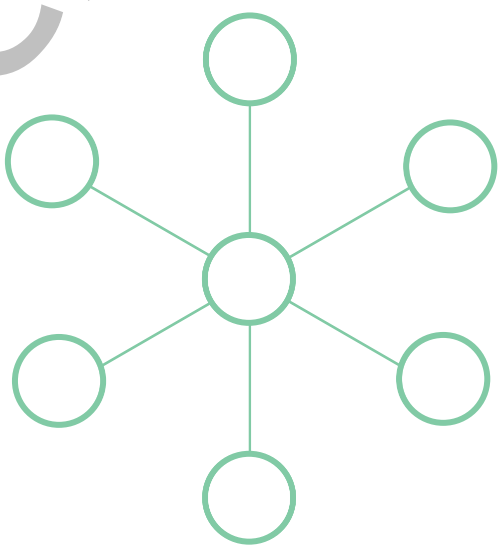
g.	7 + ___ = 20	h.	31 + ___ = 100
i.	650 + ___ = 1000	j.	30 - ___ = 17
k.	___ - 24 = 36	l.	___ - 1450 = 2000

6. 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.

7. There are exactly 3 ways to add 4 odd numbers to get 10.

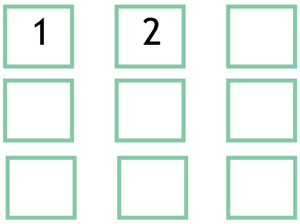
For example: 1 + 3 + 5 + 1 = 10.
Find the other two ways.

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



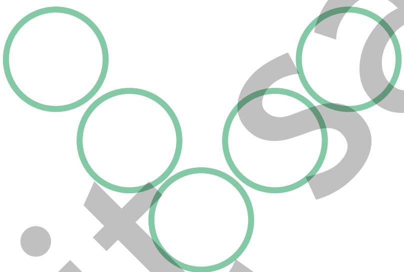
9. Kathy had a pack of 9 cards numbered from 1 to 9. She arranged the cards into 5 unequal piles where each pile added to the **same total**.

What was the total and how could this be done?



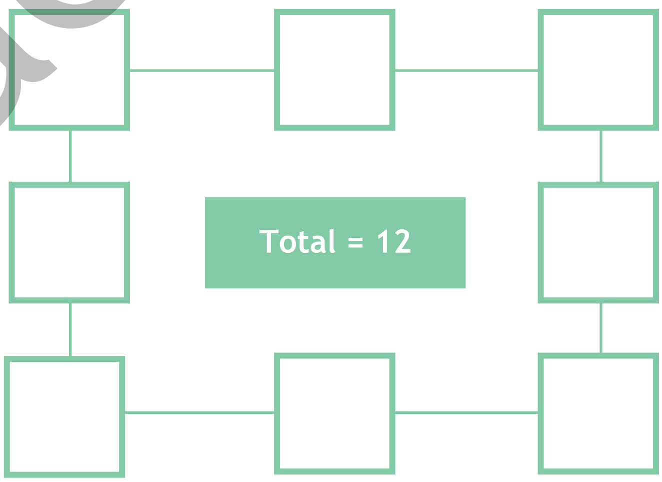
10. a. Place each of the numbers 1 to 5 in the V shape so that the two arms of the V have the **same total.**

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



1 **2** **3** **4** **5**

11. Place each of the numbers **1** to **8** in the boxes below so that each row adds up to a **total equal to 12.**



1 2 3 4 5 6 7 8

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

a. Ring 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)**
- And 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 number of **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 eg: A-Q1 → B-Q1

The following hints or tips can be given to help give the pupils a start. Pupils 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 … divided 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 and 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'.

Example:

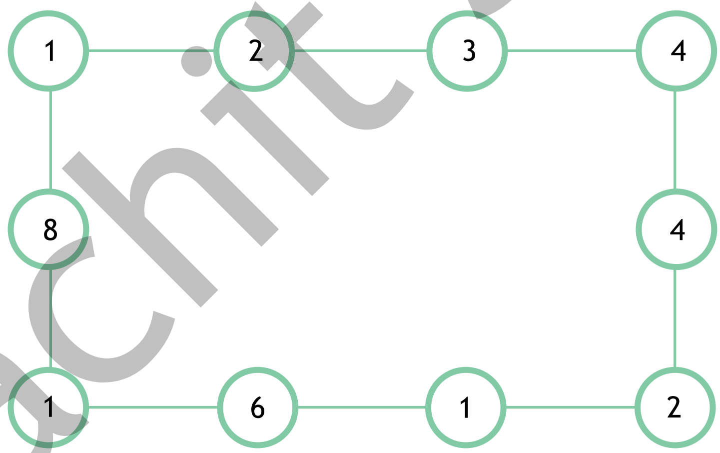
1. Fill in the gaps: [S]

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	11111

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]

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

1.

a.	7 + **13** = 20	b.	31 + **69** = 100
c.	650 + **350** = 1000	d.	30 - **13** = 17
e.	**60** - 24 = 36	f.	**550** - 1450 = 2000

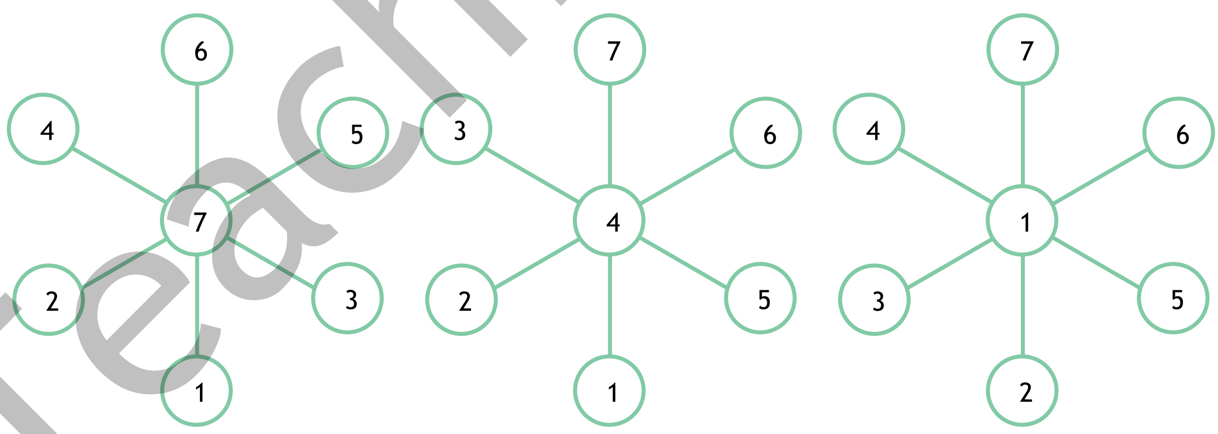
2.

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	11112, 11121, 11211, 12111 and 21111.
6-digit	111111.

3.

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

4.

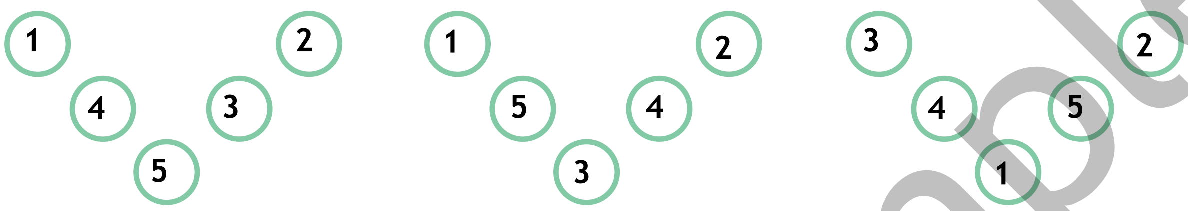


5.

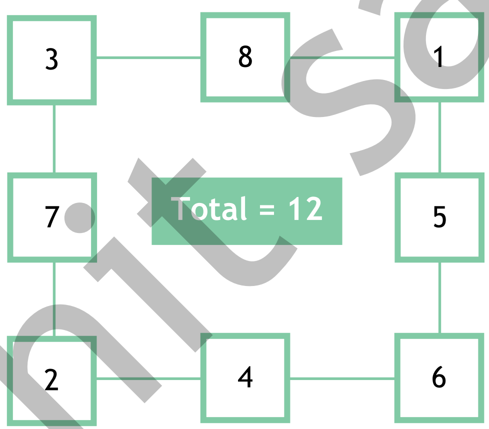
1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45 . . .
45 ÷ 5 = 9 . . . so each pile adds up to 9.

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

6. a.



b.



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 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**