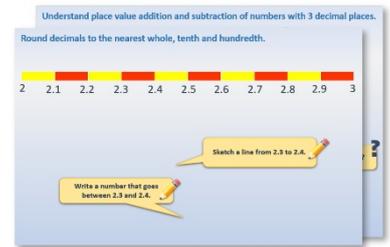# Week 15, Day 4
Calendar investigations

Each day covers one maths topic. It should take you about 1 hour or just a little more.

1. Start by reading through the **Learning Reminders**.

2. Think you've cracked it? Have a go at the **Investigation**…

3. Finding it tricky? That's OK… have a go with a grown-up at **A Bit Stuck?**

Learning Reminders
Calendar capers

1. Here is a month on a calendar. We can draw a 4 by 4 rectangle anywhere, as long as it is around 16 numbers. Look at the red rectangle below for an example.

Mon	Tues	Wed	Thur	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	(16)	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

2. We add the number in the top left corner to the number in the bottom right corner 7 + 31. We write the total, **38**.

3. Next we double it, i.e. 38 + 38. Write the answer, **76**.

4. Circle *any* number in the same rectangle, e.g. 16. Cross out all the numbers in the same row and column as your circled number.

Mon	Tues	Wed	Thur	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
~~14~~	~~15~~	(16)	~~17~~	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

5. Repeat this, circling another number, 22 - **not** one that is already crossed out – then cross out all the numbers in the same row and the same column as this circled number.

Mon	Tues	Wed	Thur	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
~~14~~	~~15~~	(16)	~~17~~	18	19	20
~~21~~	(22)	~~23~~	~~24~~	25	26	27
28	~~29~~	30	31			

6. Repeat this process one more time.

Mon	Tues	Wed	Thur	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	(10)	11	12	13
~~14~~	~~15~~	(16)	~~17~~	18	19	20
~~21~~	(22)	~~23~~	~~24~~	25	26	27
(28)	~~29~~	~~30~~	~~31~~			

7. Circle the last remaining number, 10.

8. Add the 4 circled numbers. 28 + 22 + 16 + 10. You could add two at a time to make it easier, e.g. 28 + 22 = 50. 16 + 10 = 26. 50 + 26 = **76.**

What do you notice about the answers in step 3 and 8? I wonder if this always happens? Let's investigate other months and choose other numbers to find out…

Investigation
Calendar capers

You will need:

Copies of a calendar (see resources). Alternatively, find your own online, e.g. HERE.

1. Pick a month on a calendar.
   Draw a 4 by 4 rectangle anywhere in that month.
2. Add the number in the top left corner to the number in the bottom right corner. Write the total.
3. Now double it, so add it to itself.

Mon	Tues	Wed	Thu	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	(16)	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

7 + 31 = 38
38 + 38 = 76

4. Circle a number in this rectangle.
   Cross out all the numbers in the same row and column as your circled number.

Mon	Tues	Wed	Thu	Fri	Sat	Sun
	1	2	3	4	5	6
7	8	9	10	11	12	13
~~14~~	~~15~~	(16)	~~17~~	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

5. Choose another number (not one that is crossed out) and circle it.
   Cross out all the numbers in the same row and the same column as this circled number.
6. Repeat one more time.
7. Circle the last number.
8. Add the four circled numbers. (Add two of the numbers.
   Now add the other two. Then add the two totals.)
   What do you notice? What if you add the number in the top right corner to the number in the bottom left corner?
9. Repeat the process starting with another 4 x 4 rectangle on a different month or in a different place on the same month.

Hot: Now have a go at this Challenge!

> **Challenge**
>
> Try different size rectangles. Does it still work? Can you say why/why not?

This makes a good trick! Ask someone at home to draw the rectangle on the calendar. Secretly add the two opposite corner numbers and double it. Then get the person to do the crossings out without showing you. Tell them what their four circled numbers add up to!

Investigation Answers

Calendar capers

The sum of the four circled numbers is double the total of the two numbers in the top left hand corner and bottom right hand corner (or the total of the top right and bottom left numbers). Children may also notice that the total of the four circled numbers is the same as the total of the four numbers in the corners.

Hot:

Challenge

The puzzle still works with different sized rectangles on the calendar.

Explore more Hamilton Trust Learning Materials at https://wrht.org.uk/hamilton

Calendar for Year 2020 (United Kingdom)

January

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

February

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	

March

M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

July

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

August

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November

M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

You will need:
Copies of a calendar (see resources for the Investigation)

- Draw a square around 4 numbers on a calendar, e.g.

JUNE

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

- Add the numbers in opposite corners, top left and bottom right, 8 and 16: 16 + 8 = 24

- Now add the numbers from the other two opposite corners, 9 and 15: 15 + 9 = 24.

- What do you notice?

- Try other squares to find out whether the same thing happens.

- Does this happen with other months?

S-t-r-e-t-c-h:

- Explore what happens with bigger squares, e.g. 3 by 3 and 4 by 4...

JUNE

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

JUNE

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				